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BEFORE THE BOARD OF OIL, GAS AND MINING
DEPARTMENT OF NATURAL RESOURCES
IN AND FOR THE STATE OF UTAH

IN THE MATTER OF THE APPLICATION OF
WESTWATER FARMS, LLC, FOR ADMINISTRATIVE
APPROVAL OF THE HARLEY DOME 1 SWD WELL
LOCATED IN SECTION 10, TOWNSHIP 19 SOUTH,
RANGE 25 EAST, SLM, GRAND COUNTY, UTAH,
AS A CLASS II INJECTION WELL.

DOCKET NO. 2010-029 CAUSE NO. UIC-358.1

TAKEN AT: Department of Natural Resources
1594 West North Temple, Room 1040
Salt Lake City, Utah

DATE: Wednesday, December 8, 2010

TIME: 10:42 a.m. to 4:38 p.m.

REPORTED BY: Michelle Mallonee, RPR

ATKINSON BAKER COURT REPORTING
JOB #A403309

APPEARANCES

BOARD OF OIL, GAS AND MINING:

Douglas E. Johnson, Chairman
Ruland J. Gill, Jr.
Jake Y. Harouny
James T. Jensen
Kelly L. Payne
Samuel C. Quigley
Jean Semborski (Excused)

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Dana Dean, Associate Director, Mining
John Rogers, Associate Director, Oil and Gas
Jim Springer, Public Information Officer
Steve Schneider, Administrative Policy Coordinator
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Docket No. 2010-029 Cause No. UIC-358.1

Wednesday, December 8, 2010

(The proceedings began at 10:42 a.m.)

CHAIRMAN JOHNSON: Let's go back on the record.
Let me find my agenda again now. Okay.

This is Docket No. 2010-029 Cause No. UIC-358.1.
In the Matter of the Application of Westwater Farms, LLC,
for Administrative Approval of the Harley Dome 1 SWD Well
Located in Section 10, Township 19 South, Range 25 East,
SLM, Grand County, Utah, as a Class II Injection Well.

Mr. Clawson, you are representing Westwater
Farms?

MR. CLAWSON: That's correct. Tom Clawson on
behalf of Westwater Farms, LLC.

CHAIRMAN JOHNSON: Mr. Alder.

MR. ALDER: Mr. Chairman and Members of the
Board, if I might take a moment. I'd like to introduce
Emily Lewis to the Board. She is a professional graduate
from the University of Utah Law School and a member of
the fellowship program with the Patrick O'Hara Fellowship
Program that we do. She has been working with the
Attorney General's office for some time, recently -- is
now a member of the Bar. And she will be representing
the Division in this matter.

CHAIRMAN JOHNSON: Okay, thank you.

1 Good morning, Ms. Lewis.

2 MS. LEWIS: Good morning.

3 CHAIRMAN JOHNSON: And there is a respondent in
4 this matter, Living Rivers.

5 MR. SHEA: Yes. My name is Patrick Shea. And
6 Jacque Ramos is an attorney who is associated with me.
7 Then we have Mr. John Weisheit, who is the principal
8 behind Living Rivers.

9 CHAIRMAN JOHNSON: Okay. Thank you, Mr. Shea.

10 MR. SHEA: And I do apologize for the delay. I
11 learned that Delta Airlines in Phoenix has a 30-minute
12 rule. If you are not there 30 minutes ahead of time,
13 they won't let you check in. So I literally watched my
14 airplane take off at 6 a.m.

15 CHAIRMAN JOHNSON: Okay. We're glad you made
16 it, Mr. Shea.

17 Mr. Clawson, would you please go ahead.

18 MR. CLAWSON: I'd be glad to. I wonder,
19 however, though -- Mr. Shea filed a motion last night,
20 and I wonder if we want to deal with that before we head
21 into our case-in-chief.

22 CHAIRMAN JOHNSON: Okay. Do we have a copy of
23 that motion?

24 MR. SHEA: We have copies here. I had asked
25 Mr. Alder to get you copies. If you don't, we can

1 distribute them now.

2 CHAIRMAN JOHNSON: I don't recall seeing --

3 MR. QUIGLEY: It's in our packet.

4 CHAIRMAN JOHNSON: It's in the red folder?

5 MR. SHEA: If it's all right, Mr. Chair, we'd
6 give you those now.

7 While they're being distributed, if I might
8 explain what we're seeking today. Our first effort is
9 for a continuance for additional data to be received by
10 the Board. We understand from communication with USGS
11 and the United States Fish and Wildlife Service that
12 they'll be making further additional letters. We don't
13 have that in written confirmation, only by telephone.

14 Second, we will be requesting the Board to
15 consider certain preconditions. If, in fact, you decide
16 to go ahead and approve the application, the most
17 important of that precondition would be the drilling of
18 three monitor wells to make sure that we would have early
19 warning on any potential seepage that was unexpected
20 going towards the Colorado River.

21 I note with interest that our Governor Herbert
22 is in Las Vegas today. And one of the heated topics
23 yesterday was the status of the Colorado River. It is
24 one of the three main rivers in North America:
25 Mississippi, Colorado, and the Snake. And there are,

1 obviously, parties to the south of us that have keen
2 interest in the quality of that water.

3 So one of the reasons that Mr. Weisheit
4 contacted me was that he and Mr. Bowers, in starting
5 Living Rivers, were particularly concerned that the
6 Colorado River be maintained in its purity, if you will,
7 or in its flow without unanticipated pollution. And we
8 simply would be suggesting in our motion for the
9 continuance, and in the alternative for certain
10 preconditions, that certain measures be taken. I think
11 everybody is aware of, certainly, the BP spill, that
12 unanticipated things do happen. And we look back on
13 those and wonder why some precaution wasn't taken.

14 So I do appreciate the applicant's desire for
15 moving this ahead as quickly as possible. But I think
16 taking until your January meeting is not out of line so
17 that we could supply some additional hydrological and
18 hydrogeological information that would confirm or not
19 confirm the proposed project.

20 CHAIRMAN JOHNSON: So, Mr. Shea, in a nutshell
21 you are asking for a continuance of this matter?

22 MR. SHEA: In the first instance. Or in the
23 alternative --

24 CHAIRMAN JOHNSON: Or in the alternative, the
25 requested conditions to attach?

1 MR. SHEA: Right.

2 CHAIRMAN JOHNSON: And that's a motion that you
3 filed last night?

4 MR. SHEA: Right. Unfortunately, it didn't get
5 sent until 5:07 because I was out. But -- and let me add
6 one of the other requests -- which I think you could rule
7 on now -- is a request to keep the record open. So that
8 even if you do make a decision, we could supply some
9 additional information that we think will be forthcoming.
10 But I certainly couldn't stand here today and promise it
11 to you. I've literally been on this matter for less than
12 a week.

13 CHAIRMAN JOHNSON: Mr. Clawson, have you had a
14 chance to review the request for continuance?

15 MR. CLAWSON: Well, I received it sort of by
16 happenstance at 8 o'clock last night. So I have reviewed
17 it. And the way I would respond to the motion is, is
18 that obviously we haven't had an opportunity to prepare a
19 written response. It makes a number of factual
20 allegations without any foundation. There's no
21 affidavit, there is no sworn testimony. It suffers in
22 that there's no motion. In regards to factual
23 statements, there's no motion.

24 I mean, I view this as two things. One, it's an
25 untimely submittal of objections to the permit. This

1 should have been filed two weeks ago. This is the first
2 we've actually seen a written statement of what they are
3 concerned about. I think if they do that, there needs to
4 be a motion to show good cause why they should be able to
5 bring these points up at the hearing.

6 And then secondly, as to the motion to -- I
7 mean, we obviously object to the motion to continue.
8 We've already been through this.

9 And as to the motion to keep the record open so
10 that they can submit -- maybe submit some more
11 information that might be prepared by some other people,
12 I don't think that's well put. And I think that at the
13 end of today's hearing, the Board can decide whether or
14 not it needs any more information or not. We would
15 object to the submittal of any factual information as
16 being untimely at this point.

17 That being said, we have had an opportunity to
18 look through this motion and the factual allegations.
19 We're ready to meet them heads on. We don't think they
20 make any sense whatsoever. It shows almost a total
21 misunderstanding of what this project is about.

22 I would submit that we should go ahead with this
23 hearing. We'll go ahead with our case-in-chief as
24 prepared. And then at the end of each of my witnesses'
25 testimony, we can go through the portion of this letter

1 that pertains to their particular expertise or personal
2 knowledge, and with sworn testimony address those issues.
3 And then the Board can decide whether or not there's
4 still remaining issues.

5 CHAIRMAN JOHNSON: Ms. Lewis, do you have any
6 comments?

7 MS. LEWIS: The Division feels that -- agrees
8 that the motion has been untimely. But if the Board
9 feels that after hearing the testimony today you need
10 more time to make your decision, we would agree with
11 that, as well.

12 MR. SHEA: Could I ask one question?

13 CHAIRMAN JOHNSON: Mr. Shea.

14 MR. SHEA: Would it be possible, just for
15 efficiency's sake, I agree -- Mr. Clawson is an excellent
16 lawyer and is obviously quite well prepared today. I
17 would like an opportunity after his witnesses have given
18 their direct testimony to cross-examine them as to the
19 factual representations they are making. I think that
20 would be an efficient way to handle it.

21 CHAIRMAN JOHNSON: As a respondent, that is what
22 you will be afforded.

23 MR. SHEA: All right. Thank you.

24 CHAIRMAN JOHNSON: Mr. Gill.

25 MR. GILL: Just so that we have as complete

1 information as possible in making our decision, how would
2 you be disadvantaged by putting this off for a month,
3 assuming that you are here, ready, you've got people that
4 have probably traveled a great distance. Would you just
5 go into that a little the bit?

6 MR. CLAWSON: I'd be glad to. It was actually
7 included in our rebuttal -- or our response to the
8 previous motion to continue.

9 It's not just one month, it's two months. You
10 know, we're talking the end of January. It's about --
11 what was it, seven weeks? It's just short of two months
12 because of the Board's -- you know, the way it schedules
13 the November and the December hearings. There is,
14 concurrent with this proceeding, another conditional use
15 permit proceeding tonight for Grand County to be held
16 down in Moab. And one of the conditions of the grant of
17 that Conditional Use Permit is approval by the Board or
18 the Division of this UIC operation. And so by putting
19 this hearing off, we also put off the conditional use
20 permit hearing.

21 It's not the Board's responsibility to keep a
22 planning hearing going in Grand County. But it has the
23 consequence of delaying that decision, probably, into
24 February. That decision, being the Grand County
25 Planning -- it's the Planning Commission hearing tonight.

1 That will put it off into February. So really, there's
2 at least a two-month delay.

3 This well is ready to go. They have contracts
4 with people that are -- operations that are seeking to
5 inject this water into this facility. They have
6 general -- or service contracts with oil and gas
7 operators. And you know, if approval were given, they
8 could start injecting in just a matter of weeks, which is
9 a revenue flow. So it costs them money the longer they
10 wait.

11 That, on top of the fact that we're ready to go.
12 We've been ready to go. As part of my introduction, I
13 mean -- you know, one thing to keep in mind is this is a
14 generic UIC application. There's nothing special about
15 this injection well. It's standard form. The Division
16 would have approved it administratively, but for the fact
17 that when they published notice of it there were some
18 objections filed, one of which was withdrawn; the other
19 one being Living Rivers, who is here today to make their
20 case; and a third by a person, an individual, William
21 Love, who, you know, did not respond to the Request for
22 Agency Action.

23 That was back in September. So they've already
24 knocked this off track for September, October, November,
25 and we're in December. And now they want more time to

1 prepare their case. And I just think that's bad form.

2 CHAIRMAN JOHNSON: Okay.

3 Does the Board have any other questions or
4 comments on this?

5 Mr. Jensen.

6 MR. JENSEN: It seems to me that we have
7 addressed this issue of a continuance and understand the
8 concerns. I personally think that we ought to go
9 forward, understanding that there is no guarantee that by
10 going forward that this Board is going to reach a
11 decision today.

12 MR. CLAWSON: Absolutely.

13 MR. JENSEN: So you may very well have this
14 issue. But it seems to me that we ought to go forward
15 and let the parties put on their evidence and see if they
16 can sustain their burden of proof. And let's see where
17 it goes.

18 MR. GILL: Do you need to hear from Mr. Shea?

19 CHAIRMAN JOHNSON: Mr. Shea.

20 MR. SHEA: Could I make one point? I did talk
21 to Pam Hackley, who is the staff person for the Grand
22 County Planning Commission, about the hearing tonight.
23 And she says that there's still a lot of questions. It's
24 not definitive that it's going to go forward. So I don't
25 think that that should be a driving force for the Board

1 making a decision this morning.

2 MR. GILL: I think it would be fair to put on
3 notice, though, that at least one Board member under
4 40-6-1 believes that this Board has exclusive authority
5 over oil and gas operations, including the matter being
6 heard today. And the planning commission's involvement
7 in that would be outside the statute and completely
8 barred. And there would be an appropriate motion be made
9 through the Board, I believe, that would bar them from
10 any further actions on this matter, that the matter is
11 completely within the matter of this Board by law.

12 MR. SHEA: I certainly have had my experiences
13 in dealing with counties.

14 MR. GILL: That doesn't change what the County
15 will do.

16 MR. SHEA: I don't want to even get in that
17 fight.

18 CHAIRMAN JOHNSON: The question before us right
19 now is a request for continuance.

20 And based upon the discussions and arguments
21 we've heard, I see no reason that the Board should grant
22 a continuance, which is actually the second request for
23 continuance in this matter.

24 MR. SHEA: Could I just make one procedural
25 observation? It does seem to me, again, as an outsider,

1 but somebody who is quite familiar with Division of Oil,
2 Gas and Mining, that having had an informal proceeding
3 would have facilitated the flow of information. And it
4 was at the petitioner's request that it became formal.

5 That's a distinction that many of the people who
6 don't regularly appear before the Board understand. But
7 if we're looking for information, that is one step that
8 ought to be looked at in the future to generate some
9 additional information -- not to say that it's not proper
10 that we're here today on a formal adjudication.

11 CHAIRMAN JOHNSON: Okay.

12 Mr. Payne.

13 MR. PAYNE: Motion to deny the request for
14 continuance.

15 CHAIRMAN JOHNSON: Okay.

16 Is there a second?

17 MR. JENSEN: Second.

18 CHAIRMAN JOHNSON: It's been moved and seconded
19 to deny the request for continuance.

20 Any other discussion?

21 All those in favor say "aye."

22 THE BOARD: Aye.

23 CHAIRMAN JOHNSON: Is anyone opposed?

24 So the request for continuance is not granted.

25 Mr. Clawson, could you move ahead with your

1 case.

2 MR. CLAWSON: Sure. I'm just going to jump
3 right into it. The Board's got other items on its
4 agenda. And I think you understand basically what's
5 going on here. I'm going to jump into it.

6 I have two witnesses here today. On my right is
7 Dave Stewart. He is the president of ERPWD, who is --
8 and Westwater Farms, the applicant, is an affiliate of
9 that organization. Dave is also a professional engineer
10 and the chief technical officer of Produced Water
11 Development, LLC, which is the owners of the ERPWD.

12 And on my left is Dave Allin. He's a consulting
13 geologist and hydrological engineer working for Westwater
14 Farms for the purposes of this UIC application for the
15 Harley Dome No. 1 well. And I ask that my witnesses be
16 sworn in at this time.

17 CHAIRMAN JOHNSON: Let's do that, please.

18 THE REPORTER: Will you raise your right hands,
19 please.

20 You and each of you do solemnly swear the
21 testimony you are about to give will be the truth, the
22 whole truth, and nothing but the truth so help you God?

23 (The witnesses answered in the affirmative.)

24 MR. CLAWSON: My first witness is Dave Stewart.

25 DAVID R. STEWART,

1 having been first duly sworn,
2 was examined and testified as follows:

3 DIRECT EXAMINATION

4 BY MR. CLAWSON:

5 MR. CLAWSON: Would you please state your name
6 and address for the record.

7 MR. STEWART: David R. Stewart. 3801 Automation
8 Way, Suite 200, Fort Collins, Colorado, 80525.

9 MR. CLAWSON: And what is your affiliation with
10 Westwater Farms, LLC?

11 MR. STEWART: I'm a partner of ERPWD, which is
12 an affiliate of Westwater Farms, LLC.

13 MR. CLAWSON: And what are your principal
14 responsibilities in that position?

15 MR. STEWART: I'm the chief technical officer
16 for PWD, and I do all the scientific engineering aspects,
17 administer that.

18 MR. CLAWSON: Would you please give us a brief
19 statement of your education and experience?

20 MR. STEWART: Sure. I'm an engineer for over 35
21 years. I have a BS in civil engineering, a masters in
22 environmental engineering, MBA and a Ph.D. in
23 environmental engineering.

24 MR. CLAWSON: And how long have you been working
25 in the environmental industry?

1 MR. STEWART: Thirty-five years.

2 MR. CLAWSON: Do you hold any professional
3 licenses or belong to any professional organizations?

4 MR. STEWART: Yes. I'm licensed in six states,
5 including the state of Utah. And I'm the lead on many
6 national environmental engineering committees.

7 MR. CLAWSON: Have you ever testified as an
8 expert witness before?

9 MR. STEWART: Yes. I've testified in federal
10 court, state court, and in front of the U.S. Congress.

11 MR. CLAWSON: Have you testified before any oil
12 and gas commissions?

13 MR. STEWART: Yes. I've testified in front of
14 the Colorado Oil and Gas Conservation Commission.

15 MR. CLAWSON: Are you familiar with Westwater's
16 UIC application and the nature of the formation water in
17 the Wingate Sandstone and the water to be injected into
18 the Harley Dome well?

19 MR. STEWART: Yes, I am very familiar with that.

20 MR. CLAWSON: I'd ask that Dr. Stewart be
21 recognized as an expert in the present matter for
22 purposes of water chemistry and compatibility of the
23 formation and produced water.

24 CHAIRMAN JOHNSON: Ms. Lewis, do you have any
25 questions or objections?

1 MS. LEWIS: No.

2 CHAIRMAN JOHNSON: Mr. Shea.

3 MR. SHEA: Could I ask a foundational question
4 on the sampling that he's testifying to?

5 I was given this morning some data which
6 reflects modeling as opposed to actual testing of the
7 waste water that would be injected.

8 Could you clarify how the model was generated?

9 MR. STEWART: Sure. We took daily samples for
10 an eight-week period, produced water, that we tested in
11 our pilot plan at the site. We also had formation water
12 that we obtained during the drilling of the injection
13 well.

14 MR. SHEA: And when you say "produced water," is
15 that produced from where?

16 MR. STEWART: From oil and gas wells from the
17 Uinta-Piceance basins.

18 MR. SHEA: Do we have the precise location, or
19 is this --

20 CHAIRMAN JOHNSON: Mr. Shea, we're trying to
21 decide whether or not Mr. -- or Dr. Stewart should be
22 treated as an expert witness. I think he's going to be
23 getting into testimony.

24 Do you have any questions or objections
25 regarding his --

1 MR. SHEA: No. We consent that he's an expert.
2 Just wanting to make sure his data is what we can trace.
3 CHAIRMAN JOHNSON: Okay. We will be getting
4 into that.
5 MR. SHEA: All right. Thank you.
6 CHAIRMAN JOHNSON: Does the Board have any
7 questions or objections?
8 Then we'll recognize Dr. Stewart as an expert
9 for purposes of the hearing.
10 MR. CLAWSON: Thank you very much.
11 Is Westwater Farms, LLC, a Utah limited
12 liability company?
13 MR. STEWART: Yes.
14 MR. CLAWSON: Is it in good standing?
15 MR. STEWART: Yes.
16 MR. CLAWSON: Where is its principal place of
17 business?
18 MR. STEWART: Cisco, Utah.
19 MR. CLAWSON: And is it qualified to conduct
20 business in Utah?
21 MR. STEWART: Yes.
22 MR. CLAWSON: Now I'd refer you to the exhibit
23 marked 1-1. Are you familiar with this exhibit? Have
24 you examined it?
25 MR. STEWART: Yes, I have.

1 MR. CLAWSON: Can you please tell us what this
2 picture is and what it shows.

3 MR. STEWART: It's an exhibit of the state of
4 Utah -- a picture of the state of Utah with the general
5 roads, river system that --

6 MR. JENSEN: I don't know that we have this
7 exhibit, Mr. Clawson.

8 MR. SHEA: We don't, either.

9 CHAIRMAN JOHNSON: Where did you get it, Sam?

10 MR. QUIGLEY: It was in our packet.

11 CHAIRMAN JOHNSON: Okay. Give us a minute. Let
12 us find that.

13 MR. SHEA: Can we get a copy?

14 MR. CLAWSON: You know, I don't have another set
15 of copies.

16 MS. CARTER: How many copies are needed?

17 MR. SHEA: Just one.

18 MS. CARTER: I'll get one.

19 MR. SHEA: Thank you.

20 CHAIRMAN JOHNSON: Okay. I believe we have
21 enough copies spread around now.

22 I'm sorry. Go ahead.

23 MR. CLAWSON: Okay. We're looking at
24 Exhibit 1-1.

25 MR. STEWART: That's a picture of Utah. It has

1 the location of the injection well in Harley Dome 1.

2 MR. CLAWSON: Is that over by the Colorado
3 border?

4 MR. STEWART: Yes, it is.

5 MR. CLAWSON: Okay. Now, I'd refer you to
6 Exhibit 1- -- well, it's 1-2. It's the second page of
7 Exhibit 1.

8 MR. STEWART: This is --

9 MR. CLAWSON: First of all, are you familiar
10 with this exhibit, and have you examined it?

11 MR. STEWART: Yes, I have.

12 MR. CLAWSON: And what is this exhibit, and what
13 does it show?

14 MR. STEWART: This is a topographic map of that
15 same area. So it's zeroing in on that location of the
16 project site, as well as the location of the injection
17 well.

18 MR. CLAWSON: Okay. Now, I'd refer you to
19 Exhibit 2. Are you familiar with this exhibit? Have you
20 examined it?

21 MR. STEWART: Yes, I have.

22 MR. CLAWSON: What is this exhibit, and what
23 does it show?

24 MR. STEWART: This was part of the application
25 for the UIC permit, and so it shows, actually, quite a

1 bit of information.

2 The white square in the center of this exhibit
3 is the area that shows the private land around that
4 Westwater exit. It shows the ownership of that. It also
5 shows the ownership of the various leasing rights, as
6 well as the helium reserve that's on the BLM land.

7 MR. CLAWSON: And is the white-colored section,
8 are those the -- is that the northeast quarter of Section
9 10?

10 MR. STEWART: Yes, it is.

11 MR. CLAWSON: And are those the subject lands?

12 MR. STEWART: Yes.

13 MR. CLAWSON: Does this show the surface owners
14 and the mineral owners within a half-mile radius of the
15 well?

16 MR. STEWART: It does, and the other private
17 land owners, Mid-America Pipeline. The rest are surface
18 or mineral right owners.

19 MR. CLAWSON: And who are those?

20 MR. STEWART: One is the state land, BLM, and
21 then Mid-America.

22 MR. CLAWSON: Does Westwater Farms own the
23 portions of the surface in the northeast quarter?

24 MR. STEWART: Yes, it does.

25 MR. CLAWSON: Does it own all of the northeast

1 quarter?

2 MR. STEWART: No. As you can see, there's a
3 little triangle off to the southeast portion of that
4 quarter section owned by Mid-America Pipeline's company.

5 MR. CLAWSON: And are the highways that are --
6 well, first of all, what are the highways that are shown
7 on the map?

8 MR. STEWART: Old US-6, as well as I-70 going
9 through there.

10 MR. CLAWSON: And are those highways based on
11 rights-of-way only?

12 MR. STEWART: Yes.

13 MR. CLAWSON: And who owns the minerals in the
14 northeast quarter?

15 MR. STEWART: They're owned by others.
16 Westwater Farms does not have any of the mineral rights.

17 MR. CLAWSON: Does the BLM own the minerals in
18 the northeast quarter?

19 MR. STEWART: Yes.

20 MR. CLAWSON: Now I refer you to Exhibit No. 3.
21 Have you examined this exhibit, and are you familiar with
22 it?

23 MR. STEWART: Yes, I am.

24 CHAIRMAN JOHNSON: We're on Exhibit 3 now?

25 MR. CLAWSON: We are. Was there a question?

1 CHAIRMAN JOHNSON: No, we were just trying to --

2 MR. GILL: We're trying to find I-70. And --

3 well, may I ask a question?

4 CHAIRMAN JOHNSON: Go ahead.

5 MR. GILL: The question relates to the center

6 white area, the purple marking for the highways. There's

7 a -- you've got Highway I-70, and then you've got this

8 purple leg that goes over to Highway 6.

9 MR. STEWART: Yes.

10 MR. GILL: Is that an off ramp?

11 MR. STEWART: That's an off ramp and a county

12 road.

13 MR. GILL: And a county road. Okay.

14 CHAIRMAN JOHNSON: All right. Thank you.

15 MR. CLAWSON: And those are rights-of-way only.

16 Now we're on Exhibit No. 3. Have you examined

17 this exhibit? Are you familiar with it?

18 MR. STEWART: Yes.

19 MR. CLAWSON: And could you please tell us what

20 this is and what it shows.

21 MR. STEWART: This is also part of the UIC

22 application. It shows the well location. And it's a

23 survey being done by Tim Keogh out of Moab.

24 MR. CLAWSON: Does it show the detail of the

25 northeast quarter?

1 MR. STEWART: Yes, it does.

2 MR. CLAWSON: Did the BLM protest the UIC
3 application in connection with the Division's earlier
4 publication in the informal proceeding?

5 MR. STEWART: Yes, it did.

6 MR. CLAWSON: Is the letter filed by the BLM
7 part of this package of exhibits?

8 MR. STEWART: Yes, it is.

9 MR. CLAWSON: Can you please tell us what
10 exhibit it is?

11 MR. STEWART: That would be Exhibit 5.

12 MR. CLAWSON: What was the basis of the BLM
13 protest?

14 MR. STEWART: They were concerned about the --
15 as you can see on that one exhibit that had the helium
16 located there, they were concerned that the helium --
17 that this injection well would have sulfate bacteria and
18 form sulfuric acid, which would sour the gas -- or
19 hydrogen sulfide. So they were very concerned that this
20 injection well had the potential to sour their gas and
21 render that helium nonusable.

22 So we had a very -- we met with them, went
23 through it, went through the geology. And subsequent to
24 that, they pulled their objection, which is the next
25 letter.

1 MR. CLAWSON: It's the next letter in Exhibit 5?

2 MR. STEWART: Yes.

3 MR. CLAWSON: In connection with the BLM's

4 concerns and protest, what is Westwater Farms going to do

5 to ensure that gases are not produced because of the

6 injection?

7 MR. STEWART: The only way that microbiology can

8 form that hydrogen sulfide, one, it has to have sulfates,

9 which are in the formation. The other thing it has to

10 have is an organic food source. So we're removing all

11 organics prior to injection just to make sure of that.

12 We're also, then, treating the water with a

13 biocide. So before it goes down, it will have a biocide

14 that would control any organics that might be present --

15 or any bacteria that might be present.

16 MR. CLAWSON: Will Westwater Farms be able to

17 monitor the condition of the water in the reservoir to

18 make sure the gas is not being produced?

19 MR. STEWART: Yes, we will.

20 MR. CLAWSON: Okay. Were any other protests

21 filed?

22 MR. STEWART: There were two other protests, one

23 by Living Waters, and one by Mr. Love.

24 MR. CLAWSON: Did the Fish and Wildlife Service

25 also file a letter?

1 MR. STEWART: They filed a letter. It was not a
2 letter of protest. It was more of a letter explaining
3 there were endangered fish on the Colorado River, which
4 we were very well aware of.

5 We had various conversations with U.S. Fish and
6 Wildlife attempting to satisfy their concerns, which we
7 did. That resulted in a baseline study, where we went
8 through -- we had discussions with them before we did it.
9 They agreed with what we were proposing. And essentially
10 what we were doing was looking for seeps in the Wingate
11 Formation in Westwater Canyon. So we essentially walked
12 the whole canyon. We also interviewed the various BLM
13 rangers, asking if there were any seeps, hanging gardens,
14 those kinds of things that indicate water is there from
15 that formation. And they said that there was no water,
16 nor had they ever seen any.

17 What we've committed to do is to do that every
18 six months while -- for the next three years while the
19 injection well is operational, and then continue to do it
20 annually past that point.

21 MR. CLAWSON: Is the Fish and Wildlife Service
22 advisory letter part of the Board's hearing exhibits?

23 MR. STEWART: Yes, it is.

24 MR. CLAWSON: And which exhibit is that?

25 MR. STEWART: Oh, Exhibit 6.

1 MR. CLAWSON: And is there also another letter
2 from Stewart Consulting back to the Forest -- or the Fish
3 and Wildlife Service regarding their concerns?

4 MR. STEWART: Yes. We wrote them a letter
5 October 4 -- actually, to Mr. Hill -- responding to that.
6 But we've also had numerous conversations with them. And
7 we've actually filed another letter with them showing the
8 results of that baseline survey.

9 MR. CLAWSON: And are those contained in
10 Exhibit 6?

11 MR. STEWART: Yes.

12 MR. CLAWSON: Okay.

13 MR. GILL: Can I ask something about those
14 letters?

15 CHAIRMAN JOHNSON: Mr. Gill.

16 MR. GILL: The letters seem to be inconsistent
17 in one matter; and that is, one of them -- I believe the
18 BLM says that the dip is updip to the southeast. And
19 then the letter from the Fish and Wildlife says that the
20 dip is to the northeast. At some point, would you be
21 kind enough to clarify what the actual dip is and if
22 there's some --

23 MR. CLAWSON: Actually, Mr. Allin will be going
24 through that.

25 MR. GILL: Will you make sure that's covered,

1 please?

2 CHAIRMAN JOHNSON: Go ahead.

3 MR. CLAWSON: Did you meet with Living Rivers to
4 address its concerns?

5 MR. STEWART: Yes, I did.

6 MR. CLAWSON: Can you please describe that
7 process?

8 MR. STEWART: I met with Mr. Weisheit on the
9 Saturday after Thanksgiving. He was visiting family in
10 Boulder. And so we had a very pleasant meeting for a
11 couple of hours.

12 I provided him with all the information that I
13 had, both for this, as well as information on the
14 Conditional Use Permit.

15 We talked through the issue. And, you know, one
16 of the things that is interesting about this is that what
17 we're really doing is building a recycling facility. The
18 injection well is going to be used initially for produced
19 water. Once the recycling facility is up and running,
20 then it will be used for brine. But we have a brine
21 management program where we're actually going to make
22 chemistry from the brine.

23 So this facility will have an injection well
24 that won't be used. The injection well will be a backup,
25 because I've got to be able to take produced water. And

1 if something goes down in the plant, I've got to be able
2 to put the water somewhere.

3 But the reality is that this facility is going
4 to be a state-of-the-art facility. I'm one of the
5 national experts. I work with the National Academy of
6 Science on produced water. And this is a
7 state-of-the-art facility. We are investing millions of
8 dollars into this facility to essentially allow for
9 recycling this water.

10 The water that we'll produce will be a very high
11 quality water. It will be able to be discharged, if
12 needed, to supplement river flows. It can be used as a
13 frac water, or as a drilling water makeup water. It can
14 be used for agriculture purposes. So there are all kinds
15 of uses for this water.

16 And there was a recent report by the National
17 Academy of Science on the use of produced water as a new
18 resource. And that's my area of expertise.

19 I testified in both Congress as well as the
20 National Academy on this. So one of the things we're
21 trying to do is put in a facility that will be very
22 useful to domestic energy production.

23 The constraint to domestic energy production is
24 produced water. You can only generate as much energy as
25 you can get rid of the water. What we're doing is

1 removing that constraint. Because as this well shows, I
2 can only put in about 6500 barrels a day into this
3 formation based on the pressures. If I have a recycle
4 facility, I remove that constraint. And so what we're
5 trying to do is come up with a state-of-the-art facility
6 in Westwater, Utah, to match that need.

7 MR. CLAWSON: Did you meet with Bill Love to
8 address his concerns?

9 MR. STEWART: I tried to contact Mr. Love. We
10 never did connect.

11 MR. CLAWSON: Did he file a response to
12 Westwater's Request for Agency Action?

13 MR. STEWART: No.

14 MR. CLAWSON: Now, I'd refer you to Exhibit
15 No. 4.

16 CHAIRMAN JOHNSON: Go ahead.

17 MR. CLAWSON: Is this the Request for Agency
18 Action that has been filed in this cause?

19 MR. STEWART: Yes, it is.

20 MR. CLAWSON: Toward the back of the Request
21 there's a list of names and addresses.

22 Is this a certificate of mailing for the Request
23 for Agency Action?

24 MR. STEWART: Yes, it is.

25 MR. CLAWSON: And what does it show?

1 MR. STEWART: It shows all the owners within a
2 half mile radius as well as the operators and surface
3 owners and the people who are protesting the UIC permit.

4 MR. CLAWSON: How did you determine what parties
5 to include on this list?

6 MR. STEWART: Just from that. They either
7 have -- they're either with UDOGM or with Grand County,
8 they own property, or they've protested this.

9 MR. CLAWSON: Was the Request for Agency Action
10 mailed to everyone on this list?

11 MR. STEWART: Yes.

12 MR. CLAWSON: You've already spoken as to
13 Westwater's plans for the properties in and near the
14 subject lands. And numerous times you've referred to
15 "produced water."

16 Would you please tell us what "produced water"
17 is?

18 MR. STEWART: "Produced water" is the water that
19 comes up with the oil and gas. So it either comes from
20 coalbed methane, it comes from tight gas, or it comes
21 from oil wells. That's what "produced water" is.

22 MR. CLAWSON: What will be the sources of the
23 water to be injected?

24 MR. STEWART: That's going to be produced water.

25 MR. CLAWSON: From fields in Utah?

1 MR. STEWART: From fields in Utah and Colorado.
2 It's purely a transportation thing. It's the cost of how
3 much it costs me to get rid of that, a barrel of produced
4 water. So it becomes a transportation issue.

5 MR. CLAWSON: Will any of the water be
6 associated with hydrofracking operations?

7 MR. STEWART: No.

8 MR. CLAWSON: So you're not going to take
9 fracking back flow water?

10 MR. STEWART: You can sometimes get flow back
11 associated with that water, produced water. If an
12 operator combines the two, we know it immediately. If
13 you have frac water mixed in with produced water, all
14 you've got to do is shake it up. It will foam. So we
15 know when frac water is there and when it's not there.

16 We have a different treatment technology for
17 frac water. The important thing for the injection well
18 is that we -- the reason it foams is because it has
19 surfactants. So what we do is we remove the organics,
20 which is a surfactant. So the formation would never see
21 that material.

22 MR. JENSEN: So let me understand, Mr. Stewart.
23 If a truck load of water comes in, you're going to test
24 that.

25 MR. STEWART: Absolutely.

1 MR. JENSEN: And if it has frac water evidence,
2 you're going to have the capability to remove that?

3 MR. STEWART: We segregate that particular load.
4 And we would charge them additional money for doing that.

5 MR. JENSEN: So that would not go into the
6 reservoir?

7 MR. STEWART: No.

8 MR. JENSEN: Okay. Thank you.

9 MR. CLAWSON: So to state it plainly, it's not
10 the purpose of this injection well to take frac water?

11 MR. STEWART: No, it is not.

12 MR. CLAWSON: I'd refer you to Exhibit No. 11.

13 CHAIRMAN JOHNSON: Excuse me, Mr. Clawson.
14 Go ahead, Mr. Gill.

15 MR. GILL: You've stated that you have a
16 state-of-the-art facility. Are you intending at some
17 point in your presentation to discuss what that means?

18 MR. STEWART: I can.

19 MR. CLAWSON: Well --

20 MR. GILL: If you would plan that in your
21 presentation, I'd appreciate it.

22 MR. CLAWSON: We're fine to do that. But the
23 Board is being asked to approve the Harley Dome No. 1 as
24 a UIC injection well, and it's the recycling part of the
25 plant. And the program really -- except when it comes

1 to, perhaps, testing and preparing the water for
2 injection, you know -- really isn't something that we're
3 asking the Board to approve.

4 MR. GILL: That's a good comment. The questions
5 would go more toward --

6 MR. CLAWSON: Actually, now is a good point for
7 Dr. Stewart to explain maybe the scope and --

8 MR. GILL: Dr. Stewart, if this is a backup, it
9 presupposes that the state-of-the-art facility is going
10 to accomplish what it needs to.

11 What are the stages, or what is it you are going
12 to be using in that plant generically and just generally?
13 Reverse osmosis, or what is it you are going to do? And
14 then particularly, what are you going to do about any of
15 the small hydrocarbon chains that are on that? I'd
16 appreciate knowing that.

17 MR. PAYNE: Could I ask a question, just a
18 clarifying question?

19 This plan is not a necessary pretreatment step
20 in your process, right? It merely represents an
21 opportunity. So I don't know if that clarifies this,
22 but --

23 MR. GILL: And when experts like you come before
24 the Board, it's important to teach us a little bit. And
25 so please be aware that this may be something that is not

1 material. But it is a little -- this is a new
2 technology. It's a first impression type. I don't know
3 anyone else who is doing this yet in Utah.

4 MR. STEWART: No, there is no one else doing it.

5 MR. GILL: Anyone else in the U.S.

6 MR. STEWART: That's correct. Nobody else in
7 the U.S.

8 MR. JENSEN: But for purposes of this hearing,
9 we have to assume that your facility doesn't work. And
10 there's going to be X amount -- whatever this reservoir
11 will take -- of production water that's going to go in.
12 It seems to me that's what we have to -- that's what we
13 have to assume.

14 MR. STEWART: That's correct.

15 MR. JENSEN: We hope that everything goes well
16 for you in the other facet. But I think we've got to be
17 satisfied that -- assuming your facility doesn't work --
18 that we have the -- we have the appropriate measures in
19 place to make sure -- assuming that we approve this
20 application -- to make sure that we don't have the
21 environmental contamination and the leaching issue. To
22 me, that's what's before this Board.

23 MR. STEWART: That's correct. So let me explain
24 the process.

25 The first part of the process is to recover any

1 oils. So we put in a reverse breaker into the -- a lot
2 of the oils that we get are emulsified. So we'll put a
3 reverse breaker into that oil stream, and we'll
4 physically separate oils from the water.

5 The next step that we go to, then, is aeration.
6 One of the things that we do on this facility is we
7 capture all our VOCs. So we don't let any VOCs escape
8 from the process. It's a completely closed system. We
9 capture those VOCs, and we actually use them for energy
10 purposes. So we'll burn them and use it for heat
11 generation.

12 The next thing we do is we aerate it. So we're
13 going to strip a lot of the VOCs, like benzene, toluene
14 ethylbenzene, xylenes. We're going to strip those
15 through an aeration system.

16 Past that, then we go into what's called a
17 walnut shell filter. So walnut shells have been around
18 for about 30 years -- several patents on those. And we
19 use the walnut shell to remove things like heavy oils,
20 tars, paraffins, asphaltings. That is then removed from
21 the system. Now the water is fairly clean.

22 One of the things that produced water has it in
23 it is Lithium. And it has a tremendous amount of
24 Lithium, actually, about 100 to 200 parts per million.

25 Lithium is -- we all use Smartphones. Lithium

1 is the lithium ion batteries. The United States does not
2 have very much lithium. So we have to go to Bolivia or
3 China for our lithium, which are not always friendly to
4 what we're trying to achieve.

5 So one of the things we are doing is we're
6 capturing the lithium, and we sell that off as a
7 by-product from this facility.

8 The next thing we do is we put it through what's
9 called a ceramic microfilter. This is where my patent
10 comes into play. I have a patent pending on this
11 particular process -- one patent pending and another
12 patent granted in 2002.

13 Essentially, this removes any of the heavy
14 metals. It removes any of the organics that are left.
15 And that goes off site, either as a solid waste, or as,
16 again, a by-product if we have enough lithium in it.

17 We then take that material, put it through an
18 activated carbon. Then we take out -- we possibly will
19 have an ion exchange, but we end up with an RO, so
20 reverse osmosis. We're going to remove all the salt.

21 So we get our -- in our pilot plant, our normal
22 effluent had a TDS somewhere between 50 to 100 parts per
23 million. It was very good water. It had no organics in
24 it. The salts that were there were just sodium chloride.

25 So we take that water, we can then blend it.

1 Some of the fracking companies like to have a higher TDS,
2 so they like to have something around ten to 15,000 parts
3 per million. Some of them don't want any TDS. We can
4 make it either way. We can custom blend that water.

5 The only part that's left, then, is the brine.
6 So that's a salt brine. Only has salt in it, mainly
7 sodium chloride. So we take that sodium and the
8 chloride, and we put a DC circuit between the two, and we
9 pull it through a membrane. By doing that, I can either
10 make a hypochlorous acid, or a hydrochloric acid. And I
11 can either make a sodium hydroxide or a sodium carbonate.
12 Sodium carbonate is actually a carbon negative process.
13 So we will likely make sodium carbonate because it's used
14 in glass manufacturing. And there's a glass plant in
15 Greeley, Colorado, that is more than willing to buy the
16 sodium carbonate that we make. The hypochlorous acid is
17 bleach. So we use that as a biocide.

18 So these are the products that we make out of
19 this. And this facility -- there are other produced
20 water treatment facilities. None of them go to the
21 extent that we do. We have an exclusiveness on the brine
22 treatment, and I own the patent on the ceramic piece. So
23 this facility is, like I said, the first state-of-the-art
24 facility that will do this kind of produced water
25 treatment in the U.S. -- in the world, actually.

1 MR. GILL: Do you have any magnesium?

2 MR. STEWART: We do have a little bit of
3 magnesium, but that comes out with the ceramics.

4 We also have barium, and we have to get that
5 barium out. We cannot -- even if we don't have the brine
6 treatment yet, we've got to get the barium out first
7 because we don't want that going down the well. It makes
8 barium sulfate, and you can't get rid of it.

9 MR. HAROUNY: What is actually going down the
10 well, and why do you need to inject anything if
11 everything can be used?

12 MR. STEWART: I need it as a backup. I have
13 master service agreements with oil companies. They don't
14 look kindly on me when I say, "Gee, I'm closed today."
15 That won't go over. So I have to have some place to put
16 the water.

17 MR. HAROUNY: So the facility will be capable of
18 treating 6500 barrels a day or more?

19 MR. STEWART: 15,000 barrels per day for the
20 first phase of that facility. It can be expanded to
21 60,000 barrels a day.

22 MR. HAROUNY: Does any part of the facility
23 require ponds, retaining ponds?

24 MR. STEWART: No. There are no ponds associated
25 with this facility.

1 MR. JENSEN: But your injection limitation is
2 6500?

3 MR. STEWART: That's correct, based on
4 pressures. So we have both -- Dave Allin will address
5 that. But that's what we're anticipating right now.

6 MR. JENSEN: So if you had an issue with your
7 plant, you'd simply have to throttle back the input?

8 MR. STEWART: Correct. That's correct.

9 MR. GILL: I think Mr. Payne is correct. For
10 the purposes of this hearing, it's as if that didn't
11 exist.

12 MR. STEWART: No. I understand.

13 MR. GILL: Or if it does exist, it doesn't work.

14 MR. STEWART: Right.

15 MR. GILL: It's a worst-case scenario we'll be
16 looking at for purposes --

17 MR. STEWART: And the injection well has its own
18 treatment system. So that injection well is removing the
19 organics. We're filtering through different media,
20 removing the organics. We sequester the barium, and we
21 add a chlorine solution to keep the microbiology at bay.

22 MR. GILL: You'll get to testify about that?
23 You'll testify about that at that point, or are you
24 making that --

25 CHAIRMAN JOHNSON: Testify about what?

1 MR. GILL: My question is: My understanding is
2 that you've got this stand-alone plan. Then you have the
3 injection well itself with related facilities.

4 MR. STEWART: Correct.

5 MR. GILL: Part of those facilities that do come
6 into the worst-case scenario is what you are describing
7 to me now?

8 MR. STEWART: That's correct. And that's in a
9 memo where I did the calculation. The Division wanted to
10 make sure that we were looking at compatibility of our
11 injectate into the reservoir.

12 MR. CLAWSON: So this is a good point to segue
13 into that further part of our presentation.

14 MR. GILL: It would be a really good point,
15 because I think we're on it. I don't want to tell you
16 how to make your case.

17 MR. CLAWSON: No, actually that was the next
18 thing we were going to do.

19 CHAIRMAN JOHNSON: Will you be changing
20 witnesses?

21 MR. CLAWSON: No. We've qualified Dr. Stewart
22 as an expert for the water chemistry. And now I'd like
23 him to delve into the aspects of both types of water
24 involved in this facility -- or the injection well.

25 CHAIRMAN JOHNSON: Okay. Let's go ahead.

1 MR. CLAWSON: So let me refer you to Exhibit
2 No. 11, which is in the Board's packet for today. And
3 also earlier today we filed a packet of three exhibits,
4 rebuttal exhibits, because we anticipated these kinds of
5 questions, particularly in view of the letter that Living
6 Rivers filed last night. So I would also call your
7 attention to what's marked as Rebuttal Exhibit No. 1.

8 CHAIRMAN JOHNSON: Okay. So first, we're going
9 with Exhibit 11, Mr. Clawson?

10 MR. CLAWSON: Well, we can start with 11. But I
11 want him to be able to talk from both exhibits.

12 CHAIRMAN JOHNSON: Okay.

13 MR. CLAWSON: It will flow better that way.

14 CHAIRMAN JOHNSON: Go ahead.

15 MR. CLAWSON: So with respect to Exhibit No. 11,
16 are you familiar with this exhibit, and have you examined
17 it?

18 MR. STEWART: Yes, I have.

19 MR. CLAWSON: Can you just briefly tell us what
20 it is.

21 MR. STEWART: It's the test results from
22 Halliburton during the drilling of the injection well.

23 MR. CLAWSON: Okay. Now I'd refer you to
24 Rebuttal Exhibit No. 1.

25 MR. STEWART: Yes.

1 MR. CLAWSON: Are you familiar with this
2 exhibit, and have you examined it?

3 MR. STEWART: Yes.

4 MR. CLAWSON: Can you please tell us what this
5 exhibit is?

6 MR. STEWART: This is a modeling that we had to
7 do to make sure that the injection water is going to be
8 compatible with the formation water. So what you're
9 doing here, we had -- as I said before, we've tested --
10 we had a pilot on site for eight weeks, and we tested
11 that water every day. We know where the water came from,
12 from what wells, from what companies. And we tested
13 water, both from the Uinta Basin as well as the Piceance
14 Basin. And in that, we came up with what we call an
15 "average water quality" for that injectate. So that's in
16 this memo.

17 When we run -- then we run MINTEQ, and that's an
18 EPA program that predicts solubility of chemistry and
19 natural waters. And what we find is that, of course, we
20 get a barium sulfate. We get a barium sulfate, we get a
21 chrysotile and dolomite. Dolomite is very easy to
22 handle. I can just put an acid down the well and get
23 that to redissolve. Barium sulfate and chrysotile does
24 not do that. So you've got to sequester that.

25 So we worked with Baker Petrolite, and they have

1 suggested several sequestering agents. They are doing
2 some additional testing as we speak. But it's our
3 anticipation that -- and they have every confidence that
4 they are going to come up with the right sequestering
5 agent. And then we will inject that at whatever dose
6 they recommend, plus the biocide.

7 MR. JENSEN: And again, we're talking about raw
8 water received that hasn't gone through your facility?

9 MR. STEWART: That's correct. It's gone through
10 the treatment process to remove the organics. It's gone
11 through the oil separation piece.

12 MR. JENSEN: Which you'll do in any event.

13 MR. STEWART: That's correct. All of that is
14 being done in any event.

15 MR. JENSEN: Okay. Thank you.

16 MR. CLAWSON: So when produced water is
17 transported to the proposed injection well, it will be
18 tested and analyzed and treated before it will be
19 injected?

20 MR. STEWART: Oh, absolutely. The last thing we
21 want to do is cement our well. I mean, that's our
22 livelihood. So we're going to check that chemistry all
23 the time.

24 MR. CLAWSON: In your expert opinion, is the
25 water to be injected compatible with the formation water

1 in the Wingate Sandstone?

2 MR. STEWART: With treatment it is.

3 MR. CLAWSON: Okay. Now I'd refer you to
4 Exhibits 1 through 6.

5 MR. JENSEN: May I ask before you go, Mr.
6 Clawson?

7 MR. CLAWSON: Sure.

8 MR. JENSEN: You've got a truck that comes in,
9 and let's say it's got 80 or 100 barrels on it. And you
10 are taking a quick sample.

11 MR. STEWART: Correct.

12 MR. JENSEN: And let's say that you've got
13 issues with that, and it's got to have whatever
14 treatment.

15 How do you keep that separate from other water?
16 Because there's trucks backed up. So what's happening?

17 MR. STEWART: We have a bunch of -- we have nine
18 small tanks that can take a tanker load. And before they
19 go up to the large oil water separator where we're
20 putting in, they go into these small tanks. And so
21 typically, they'll just do that.

22 But if the operator sees something -- he'll take
23 a quick sample of it. If he sees something amiss, he's
24 going to put it into a tank. That is going to sit there
25 until we figure out what to do with it.

1 MR. JENSEN: Otherwise, it will become
2 co-mingled in your process.

3 MR. STEWART: That's correct.

4 MR. JENSEN: Thank you.

5 MR. CLAWSON: Okay. I'd refer you to Exhibits 1
6 through 6, 11, and Rebuttal Exhibit No. 1.

7 Were they prepared by Westwater in connection
8 with this proceeding, or in the regular course of
9 Westwater's business activities, or are they a part of
10 the public record in this proceeding?

11 MR. STEWART: Yes.

12 MR. CLAWSON: I ask that Exhibits 1 through 6,
13 11, and Rebuttal Exhibit No. 1 be admitted.

14 CHAIRMAN JOHNSON: Ms. Lewis, any objections?

15 MS. LEWIS: No objections.

16 CHAIRMAN JOHNSON: Mr. Shea?

17 MR. SHEA: Can I ask a foundational question
18 again?

19 CHAIRMAN JOHNSON: Yes.

20 MR. SHEA: Is there a way in which the precise
21 well that these came from can be known, and is that part
22 of the public record?

23 MR. STEWART: It's not part of the public
24 record. We have absolutely QA/QC data to know where
25 these samples came from.

1 MR. SHEA: QA/QC?

2 MR. STEWART: Quality Assurance/Quality Control

3 data.

4 MR. SHEA: And is that on a GPS basis --

5 MR. STEWART: No.

6 MR. SHEA: -- or what's the combination?

7 MR. STEWART: I can get that information for

8 you. I don't have it with me. But it comes from -- the

9 oil operator tells us where this is coming from. We

10 don't go out and independently verify that.

11 MR. SHEA: The only thing that I'm trying to

12 raise to the Board is whether or not these samples truly

13 are able, even with an expert opinion, to say that

14 they're compatible with the Westwater site. I think it's

15 from a model. Models can be incorrect. And we're being

16 asked to assume something that I don't think factually

17 can be testified to at this point.

18 I think there are ways in which data could be

19 generated so the similarities or dissimilarities could be

20 determined. But so far, I haven't seen the foundation

21 for that in the evidence that's been put into the record

22 to date.

23 MR. JENSEN: It seems to me we ought to let Mr.

24 Clawson move forward, and you can handle that in cross.

25 MR. SHEA: Thank you.

1 MR. JENSEN: You are alerted to his --

2 MR. CLAWSON: I am. And I think he's fine to
3 ask those types of questions on cross-examination.

4 I would point out that he did just testify that
5 the water will be tested at the facility when it comes
6 in. And so yeah, it's important to know where it came
7 from. But the water is not going down the hole until
8 they know what it is and it's been treated.

9 MR. JENSEN: And that was his testimony.

10 MR. CLAWSON: That was his testimony. But he's
11 welcome to cross-examine on that point. The question
12 before the Board is --

13 CHAIRMAN JOHNSON: Maybe I don't understand your
14 objection, Mr. Shea. Were you talking about the water
15 samples that were used for Rebuttal Exhibit 1?

16 MR. SHEA: In Exhibit 1, yeah, the rebuttal.

17 CHAIRMAN JOHNSON: Rebuttal Exhibit 1.

18 And you are just questioning where that water
19 was, or where that water came from that was used in
20 creating the modeling?

21 MR. SHEA: I concur that it's a model.

22 What I disagree with is the source of the
23 modeling data that would be the basis for making the
24 general statement that it's the same as would be found in
25 the basins that we're talking about.

1 But I agree with Mr. Clawson that we can get
2 into that as we discuss the testing that will be done.

3 MR. JENSEN: I think that's proper cross. I
4 think we ought to let Mr. Clawson go forward with his
5 direct examination.

6 MR. PAYNE: Perhaps we could just clarify now.

7 I'm looking at this rebuttal exhibit. It says
8 "Formation Water W201" or "Formation Water W181." Are
9 these actual waters? They're not modeled water
10 composition. Let's just clear that up now.

11 These are some representative samples of
12 something that would be delivered potentially to your
13 facility?

14 MR. STEWART: Those are the formation waters.
15 What you see there --

16 MR. PAYNE: Are they waters that would be
17 delivered to your facility, or waters that you
18 encountered in your injection well?

19 MR. STEWART: In the injection well.

20 MR. PAYNE: Okay.

21 MR. STEWART: If you look at the third page of
22 this rebuttal, it says, "Representative chemistry of
23 injected water after oil removal." So what you see there
24 are eight samples. We actually have more samples than
25 that. But we use these eight samples as a means of

1 coming up with our estimated concentrations that we used
2 for the injectate water.

3 MR. PAYNE: So what was the source of the raw
4 injected water chemistry?

5 MR. STEWART: That's the produced water from the
6 pilot plant that we ran for eight weeks and we tested
7 every day.

8 MR. PAYNE: So that was from actual water that
9 you had received at your commercial operation, not a
10 modeled concentration --

11 MR. STEWART: That's correct. The DEQ was
12 adamant about this. I mean, we do not have a permit to
13 do anything with this water yet. And the County was, as
14 well.

15 So what we had to do was to bring this water in.
16 We had two Baker tanks, brought the water in. We'd
17 test -- we'd run it through one Baker tank. We'd take
18 our great effluent and put it into the other Baker tank.
19 And they'd haul that to a disposal facility. So we had
20 eight weeks of running actual samples from the various
21 basins.

22 CHAIRMAN JOHNSON: Okay. Mr. Clawson, I believe
23 you moved to admit those exhibits, didn't you?

24 MR. CLAWSON: I did.

25 CHAIRMAN JOHNSON: Exhibits 1 through 6 and 11,

1 and Rebuttal Exhibit 1 -- and noting the objection from
2 Mr. Shea -- we'll admit those.

3 MR. CLAWSON: Okay. Thank you very much.

4 Now, with respect to the letter that was filed,
5 I guess, with the Board this morning and distributed late
6 last night, I'd like Dr. Stewart -- by Living Rivers --
7 I'd like Dr. Stewart to address some of the paragraphs in
8 that letter. I think that's probably the easiest way to
9 get through this. And Mr. Shea can cross-examine him on
10 that, as well.

11 CHAIRMAN JOHNSON: So we are now talking about
12 the letter dated December 7th. Is that correct?

13 MR. CLAWSON: Correct.

14 CHAIRMAN JOHNSON: Okay.

15 MR. SHEA: Just so I'm clear, can I
16 cross-examine him now, or are we waiting until you've
17 presented your case-in-chief?

18 MR. CLAWSON: Why don't we go through the letter
19 because he's going to be testifying as to -- responding
20 to your letter. And you may want to cross-examine him on
21 that, as well.

22 MR. SHEA: So to wait --

23 MR. CLAWSON: Wait until -- right after I'm done
24 doing this, I'm done with this witness.

25 CHAIRMAN JOHNSON: Okay. Then we'll have

1 Ms. Lewis ask questions.

2 Then Mr. Shea, you can ask questions. Then the
3 Board can ask questions.

4 MR. CLAWSON: Normally at this point, I'd be
5 finished. But I think it makes sense to go through this
6 stuff while things are fresh.

7 CHAIRMAN JOHNSON: Let's go ahead.

8 MR. CLAWSON: Looking at the December 7, 2010,
9 letter from Mr. Shea to the Division of Oil, Gas and
10 Mining, and looking at the second page under,
11 "Geophysical questions and concerns," Item No. A, "Lack
12 of Capital," there's an assertion that "your venture is
13 speculative."

14 Could you please let the Board know -- you know,
15 would you please inform the Board as to the level of
16 investment in your financing?

17 MR. STEWART: Yes. We have available to us
18 \$7 million. Our plant facility is about a \$4 1/2 million
19 facility. We have plenty of capital.

20 MR. CLAWSON: And the injection well is fully
21 funded?

22 MR. STEWART: That's correct.

23 MR. CLAWSON: Under Item No. B, "Burdens to
24 Grand County," there's an allegation that "there won't be
25 any jobs or economic benefit to Grand County."

1 Can you please address that?

2 MR. STEWART: We're using local contractors for
3 the construction of our facility. Again, that's a \$4 1/2
4 million facility. We will hire between four and six
5 employees to operate this facility. And we also pay a
6 fee to Grant County on every barrel that we receive.

7 MR. CLAWSON: Under Item No. C, "Bonding and
8 Decommissioning," could you please address the nature of
9 the bond and how you would decommission this well?

10 MR. STEWART: The bonding is set by the
11 Division, so we provided whatever bond that they asked
12 for. And our plugging costs we estimated at about
13 14,500. So I think that's the reason for the \$15,000
14 bond.

15 Mr. Allin can probably answer that better than I
16 can.

17 MR. GILL: Can I interrupt here? Why are you
18 paying a fee to Grand County?

19 MR. STEWART: It's part of the Conditional Use
20 Permit.

21 MR. CLAWSON: Just by way of clarification,
22 Grand County does have authority over planning and zoning
23 for a facility built in the county dealing with roads and
24 those different issues. And so Grand County is caught
25 up -- or addressing the issues associated with the larger

1 facility, not just the injection well. And I think --

2 MR. JENSEN: It's really the surface facility
3 that gets you in before Grand County.

4 MR. CLAWSON: Right. And I think Dr. Stewart
5 can assure the Board that the County understands the
6 primacy of the Board's authority over the UIC injection
7 well. And -- actually, let me ask him.

8 Is Grand County causing a problem vis-a-vis
9 approval of the injection well?

10 MR. STEWART: No. Their ordinance specifically
11 states that the injection well itself is a state issue.
12 It has nothing to do with the County.

13 MR. GILL: Thank you.

14 MR. CLAWSON: Nevertheless, they still have to
15 go through planning and zoning.

16 Under Item No. D "Electricity," how will the
17 injection well be powered?

18 MR. STEWART: We have two on-site generators;
19 plus, we have an agreement with Wirsol. Wirsol is the
20 largest photovoltaic integrator in the world out of
21 Germany. And we're putting in a couple of megawatts
22 there for the facility, mainly because our brine
23 treatment uses DC power. Photovoltaics make DC power, so
24 we don't have to convert it. It makes it a very nice
25 fit. And we can run the rest of the facility off of

1 photovoltaic.

2 MR. CLAWSON: Under Item E, "Chemical Analysis
3 of the Produced Water," can you please, again, address
4 how Westwater Farms will address the different types of
5 water coming into this facility?

6 MR. STEWART: Again, we tested -- we've already
7 tested it. We will continue to test it. It seems to be
8 very consistent in the testing that we've done. I've
9 done testing all over the western United States. Each
10 basin has its own signature, but within the basin it
11 doesn't change very much.

12 MR. CLAWSON: And will each truck be tested
13 before it's injected?

14 MR. STEWART: Yes, it is.

15 MR. CLAWSON: So it's a daily sampling, not --

16 MR. STEWART: Certainly not monthly. Again,
17 we're protecting our asset.

18 MR. CLAWSON: Under "Air Quality," could you
19 please address the nature of how this facility will
20 affect air quality?

21 MR. STEWART: It actually -- what they refer to
22 is an ozone issue. And that ozone comes from the
23 emissions of volatile organic compounds. We capture all
24 of our VOCs and reuse them. So there are no VOCs that
25 would be affecting the ozone layer. And what the State

1 has asked for is that we -- which we have done -- is
2 apply for a permit. We have less than 500 pounds a year.
3 So they issue a non-permit through DEQ.

4 MR. CLAWSON: And then finally on the last page
5 in the third full paragraph, they raise a concern that
6 the Colorado River be safe from fracking fluid
7 contamination.

8 Again, will this facility -- will this injection
9 well be receiving frac flow back water?

10 MR. STEWART: Not into the injection well, no.

11 MR. CLAWSON: Because it will be monitored and
12 tested before it is injected?

13 MR. STEWART: That is correct.

14 MR. CLAWSON: That is all the questions I have
15 for my witness.

16 CHAIRMAN JOHNSON: Ms. Lewis, do you have
17 questions?

18 MS. LEWIS: I refer to the Division.

19 CROSS-EXAMINATION

20 BY MR. HILL:

21 MR. HILL: Just as a matter of clarification --

22 CHAIRMAN JOHNSON: Could you introduce yourself,
23 Mr. Hill.

24 MR. HILL: Brad Hill for the Division.

25 Just a matter of clarification. You mentioned

1 in your testimony the dealings with the Department of
2 Environmental Quality. Could you just explain to the
3 Board in what situations and from what -- how the permits
4 required from DEQ are separate from our underground
5 injection application?

6 MR. STEWART: Absolutely. There are a couple of
7 things. One, we have agriculture land on our -- that
8 area is zoned for agriculture land. So we have the
9 ability, under permit by rule through DEQ, to take
10 treated water and apply it to the land for agricultural
11 purposes. And it has two criteria: One, TDS below 500,
12 and there can be no oil and grease. So we have done
13 that. And we are getting an operating permit from them.
14 They're going through their own rules right now, so it's
15 difficult to get -- because they haven't finished yet.

16 We've applied for an NPDES Discharge Permit;
17 however, that's a fairly lengthy process. So we
18 anticipate that's about six months. We really don't need
19 it. Again, it's a backup to something. If we can't sell
20 the water one way, we can sell it another. We are doing
21 that.

22 And then the third was the application for the
23 air permit.

24 So those are the conversations we've had with
25 DEQ.

1 MR. HILL: I just wanted you to clarify that
2 these really don't have any bearing on the UIC
3 application. They're just for water uses, for treated
4 water at that facility.

5 MR. STEWART: That's correct.

6 MS. LEWIS: No further questions from the
7 Division.

8 CHAIRMAN JOHNSON: Mr. Shea, do you have
9 questions for Dr. Stewart?

10 MR. SHEA: I do. Could I suggest the Board take
11 a five-minute break just so I can get these in order?
12 I'm totally at your command.

13 CHAIRMAN JOHNSON: Yeah. About how long do you
14 expect your questioning to last?

15 MR. SHEA: In part, it depends on the answers I
16 get. So I would hope it could be done in a half hour,
17 but I can't guarantee that.

18 CHAIRMAN JOHNSON: Okay. Why don't we take a
19 break for lunch, then, seeing it is almost noon. And
20 we'll resume with your questioning after that.

21 MR. SHEA: Okay.

22 CHAIRMAN JOHNSON: So let's break until -- let's
23 try to start at 12:55, okay.

24 MR. SHEA: All right. That will be good.

25 CHAIRMAN JOHNSON: All right. Thank you.

1 (A break was taken from 11:52 a.m. to 12:57 p.m.)

2 CHAIRMAN JOHNSON: Okay. I believe we're ready
3 to resume.

4 Mr. Shea, I believe we're at a point where you
5 are going to put questions to Dr. Stewart.

6 MR. SHEA: Okay. What I'd like to do, if it's
7 acceptable to the Board, is divide it into four different
8 areas. And if that's -- the areas would be the
9 financing, the question of filtration, the question of
10 the sequence of the building.

11 I know the UIC is the only matter before the
12 Board today. But it does seem to me a lot of the
13 application is dependent on there being a completion of
14 the process, it's not just a question of creating the
15 injection well. Your responsibility goes to a larger
16 question of whether that's going to do something
17 irreparable to the resources of Utah and the United
18 States.

19 And then the fourth area deals with the
20 different ways in which the monitoring will occur. The
21 first and the fourth question are related. The
22 filtration question is probably -- or excuse me. The
23 second and the fourth are related; that is, the
24 filtration and the type of testing that would go on.

25 So if I may, I'll proceed in that order.

1 CHAIRMAN JOHNSON: Please go ahead.

2 MR. SHEA: And I certainly would welcome any

3 questions from the Board. I have great respect for Mr.

4 Clawson. If he thinks that my questioning is not

5 clear --

6 CHAIRMAN JOHNSON: I'm certain he will object.

7 MR. SHEA: -- I would invite his participation.

8 CROSS-EXAMINATION

9 BY MR. SHEA:

10 MR. SHEA: On the investment side, you testified

11 earlier that you had \$7 million. Is that readily

12 available? Is that in the form of a bank deposit or?

13 MR. STEWART: It's an investment banking

14 relationship that we have with our investors in ERPWD.

15 MR. SHEA: And ERPWD is?

16 MR. STEWART: Is a holding company affiliated

17 with Westwater Farms, LLC.

18 MR. SHEA: So your testimony is that if the

19 Board is to give you approval to proceed on completing

20 the UIC, there would be absolutely no financial delays.

21 MR. STEWART: Correct.

22 MR. SHEA: Could we explore, Mr. Chair, what the

23 process would be if there was some kind of financial

24 delay?

25 CHAIRMAN JOHNSON: Why don't you ask your

1 question, Mr. Shea. Let's do it that way.

2 MR. SHEA: What would be your plans, if for some
3 reason the money was not available and you had started
4 halfway through the process?

5 MR. STEWART: I'm not sure I understand your
6 question.

7 MR. SHEA: Assume for a moment that you -- say
8 the Board goes ahead and gives you approval and then you
9 get halfway into creating the injection well and the
10 financing disappears. What do you do then?

11 MR. STEWART: The financing -- I can't imagine
12 that happening because I have both the international
13 rights as well as the national rights for this
14 technology. And we have more than -- we're in the
15 process of negotiating a \$50 million line of credit. So
16 financing this little plant is not an issue.

17 I have \$7 million available today. The plant
18 cost is \$4 1/2 million. The injection well is already
19 in. All the equipment for the treatment of the injection
20 is available and on site. We can't install it until we
21 get approval by the County. But that's there and
22 available.

23 So there's no question that we'll be able to
24 finish the injection well. I've got plenty of money to
25 finish the plant as well, so I don't anticipate that

1 being an issue. That money already exists.

2 MR. SHEA: I'm sure it exists. The question
3 that I don't see before the Board is the documentation
4 sufficient to say for the citizens of Utah that there's
5 no chance that this project wouldn't go forward, but for
6 the approval of the application. And it seems to me on a
7 fiduciary basis that that needs to be clearer on the
8 record than it is today, not just a witness testifying he
9 has the money.

10 We've had several instances in Utah -- when I
11 was director of BLM, we had several mining projects that
12 got halfway completed and then, for various reasons, the
13 money disappeared.

14 MR. JENSEN: May I ask a question, Mr. Chairman?

15 CHAIRMAN JOHNSON: Go ahead, Mr. Jensen.

16 MR. JENSEN: I can appreciate your question,
17 Mr. Shea. But it seems to me that the only issue that's
18 before this Board is the injection well itself, not this
19 facility, not the funding of the facility. And it seems
20 to me that what this Board needs to be satisfied with is
21 that whatever product is going into the injection well,
22 that we've put sufficient criteria in place that this is
23 the only type of water that's going -- these parameters
24 are the only parameters that have to be met relative to
25 injection.

1 While Mr. Gill's question about the facility, I
2 think it helped to educate us, it seems to me that this
3 Board needs to stay confined to what the real issue is
4 before us. And it seems to me the issue before us is the
5 injection well itself and the product that this Board
6 would authorize and approve to be injected, what those
7 conditions are. It seems to me that's what we ought to
8 confine our hearing to. Now, I'm only one voice here,
9 but it seems to me that that's what the issue ought to be
10 and what you ought to be asking questions to either
11 ferret out or get satisfied.

12 MR. SHEA: The only thing I would raise -- if I
13 might indulge for one moment -- I've always been taught
14 "Follow the money." And in the instance of injecting the
15 water, you are going to have to finance that. And the
16 quality certainly is where the main focus of this hearing
17 today is going to be.

18 But it does seem to me to be an important,
19 answerable question of how is that process -- not the
20 building of the buildings -- but that process going to be
21 funded. And the impression I have is that it's going to
22 be funded from the revenue that's generated by oil
23 producers or gas producers paying --

24 MR. JENSEN: I think he said that there's
25 \$7 million of equity that they're prepared to put in,

1 that they've got a \$4 1/2 million cost, and just all from
2 the equity side. And that's the whole facility again.

3 MR. SHEA: Right. But I guess my question is:
4 How do we know that that money exists?

5 CHAIRMAN JOHNSON: Mr. Shea, the question before
6 the Board today has to with the UIC well. The plant is
7 something auxillary to it. We're considering the well.
8 And I understand your concern about the total project,
9 but I think as far as it relates to the question before
10 us today, I think you've asked your question, it's been
11 answered. I think we need to move on.

12 MR. SHEA: The only question I'm raising, just
13 so we have a clear record on this, is: How are they
14 going to finance the UIC? As far as I can tell, the
15 record is Dr. Stewart's representation he has the money.
16 And I don't know Dr. Stewart. So I'd like to know where
17 that money is. It seems to me that's a legitimate
18 question.

19 CHAIRMAN JOHNSON: I'm not sure that that's a
20 concern of the Board's.

21 MR. SHEA: How it's financed?

22 CHAIRMAN JOHNSON: It may be your concern. I
23 don't think it's a concern of the Board regarding the UIC
24 approval.

25 MR. SHEA: So if I come in here as an individual

1 citizen and say, "I have \$4 1/2 million," you accept that
2 as sufficient to grant me an application?

3 MR. JENSEN: We know that's true from you, Pat.

4 MR. CLAWSON: Mr. Chairman, the question has
5 been asked and answered. The answer is, is that the UIC,
6 the well, has already been drilled. It's already paid
7 for.

8 CHAIRMAN JOHNSON: I think that's a sufficient
9 answer.

10 MR. SHEA: Okay. I respectfully disagree.
11 Let's move on to a different topic.

12 Dr. Stewart indicated that he would use a
13 process to filter out any organic material -- were his
14 words -- that might create a souring of the helium.

15 What size of filter do you intend to use?

16 MR. STEWART: It's an organic filter. So we use
17 a walnut shell filter and activated carbon. It's not
18 sized based, it's chemically based. So these are
19 removing the nonpolar organic chemicals through an
20 absorption process.

21 MR. SHEA: The BLM is not concerned about the
22 chemistry. It's worried about the organic life that
23 could cause the souring.

24 MR. STEWART: You can't have organic life until
25 you have organics for them to eat. If you remove the

1 organic material from the petroleum products, then
2 there's nothing for them to eat, and they will not exist.

3 The other issue there is that we then inject a
4 biocide to verify that those organic -- that those
5 microorganisms are not there.

6 MR. SHEA: I'm a research professor of biology.
7 When I do a filtration experiment, I can tell you down to
8 .1 microns whether or not there's organic life present.

9 MR. STEWART: Correct.

10 MR. SHEA: That's different than the chemical
11 process that you are testifying on, correct?

12 MR. STEWART: No, we have both. We have a -- we
13 start out --

14 MR. SHEA: So the question was: What's the size
15 of the filter you use if you have both?

16 MR. STEWART: We use a screen size, a 20 mesh
17 screen, goes down to 20 microns, goes down to five
18 microns, goes down to one micron.

19 We also are using a walnut shell filter, which
20 has an effective pore size of one micron. Activated
21 carbon has an effective pore size of half a micron.

22 MR. SHEA: So you'll be getting any bacteria,
23 but you won't be getting any viruses or fungi, correct?

24 MR. STEWART: I would not anticipate. This is
25 not a pathological type material. We don't have,

1 typically, fungi or viruses -- certainly not viruses.
2 Viruses wouldn't come up with produced water. Fungi
3 could exist, but we've never experienced it and never
4 seen it.

5 MR. SHEA: Okay. Let me ask you: There's been
6 more or less three terms used. There's "formation
7 water," there's "produced water," and "waste water."

8 Can you describe for the Board what the
9 distinction in your vocabulary is between those three
10 types of water?

11 MR. STEWART: "Formation water," as I explained
12 it this morning, was the receiving water. So that's in
13 the Wingate Formation. The "produced water" is what
14 we're receiving at the gate. So the produced water comes
15 in from the various energy companies as they develop
16 their energy source. I'm sorry, the "waste water," we
17 have no waste water.

18 MR. SHEA: Now, the receiving water is only what
19 you would find at the UIC? I'm just trying to clarify in
20 my own mind.

21 MR. STEWART: Say that again?

22 MR. SHEA: The receiving water is the water that
23 you found when the well was drilled?

24 MR. STEWART: No, that's the formation water.
25 That's how Halliburton is identifying it. They're

1 identifying it from different formations. So that's the
2 water that we're talking about down in the formation.

3 MR. SHEA: At the UIC application site?

4 MR. STEWART: That's correct.

5 MR. SHEA: So when you said "receiving water,"
6 that's a fourth category. What does that mean?

7 MR. STEWART: I'm talking about two waters. I
8 don't know where these other terms are coming from.

9 I'm talking about "formation water," which is
10 going to be a receipt -- was going to receive this water,
11 but it's the formation water. It's what's in the
12 formation. And then I have "produced water" that I treat
13 and inject into the formation.

14 MR. SHEA: Okay. Well, let's move on.

15 You testified earlier that your experience is
16 that generally within a range the water type -- which I
17 guess is the transformation water, formational water --
18 is the same. Is that correct?

19 MR. STEWART: No. What I said was that in a
20 typical basin, you are going to have produced water
21 that's generated by the energy producers. And that
22 produced water is generally, from that basin, of similar
23 quality.

24 MR. SHEA: And when you say "similar quality,"
25 is that simply a chemical analysis, or does that include

1 a biological analysis of what organic material exists in
2 that water?

3 MR. STEWART: Well, we would do that chemically,
4 not biologically. We do not look for microorganisms in
5 that water. What we look for is a chemistry. So we look
6 for total petroleum hydrocarbons, we do GCMS scans, we do
7 volatile organic compound scans. That's how we determine
8 what organics are there.

9 MR. SHEA: Back to the BLM's letter of
10 September 15, their express concern on the helium
11 reserve.

12 MR. STEWART: Correct.

13 MR. SHEA: And actually, let me just deviate
14 here for a second.

15 Do you know why Harley Dome is called Harley
16 Dome?

17 MR. STEWART: No.

18 MR. SHEA: Do you know when it was discovered?

19 MR. STEWART: No.

20 MR. SHEA: It was created -- sort of for the
21 Board's knowledge -- in 1920 because the United States
22 declared helium a strategic reserve. So it's one of the
23 helium strategic reserves that were preserved over time.
24 And there are a number of helium companies, one of which
25 I represent, IACX, who are looking to develop the helium

1 that's found in Harley's Dome. They've developed a new
2 process.

3 I raise that only because in the context of the
4 UIC application, I think the Board -- it's important to
5 make sure that there is no potential for another resource
6 that would benefit the citizens of Utah being adversely
7 affected by it. And that's why the United States still
8 considers it an important helium reserve.

9 But back to the question of the water that will
10 be transported here.

11 You do a chemical analysis, not an organic
12 analysis. Is that correct?

13 MR. STEWART: I do a chemistry analysis, which
14 includes an organic. You are going to do an organic
15 portion of that water, and you're going to do an
16 inorganic portion of that water.

17 MR. SHEA: Describe the difference between the
18 inorganic analysis and the organic analysis.

19 MR. STEWART: The organic analysis, again, is
20 gas chromatograph, mass spectrometer. We do GPS scans
21 for both the volatile and non-volatile portions of that
22 water. We also look at simple things, like total organic
23 carbon, chemical oxygen demand, those kinds of things
24 that give us an idea of what that water is -- what its
25 characteristics are like.

1 When we go over to the inorganics side, we're
2 looking for salts, heavy metals, those issues.

3 MR. SHEA: Right. You've testified on that.

4 But your testimony is, on the organic side, is
5 that it goes down to .1 micron. Is that correct?

6 MR. STEWART: No. What I said was that we
7 remove the organics through an absorption process. These
8 filters have an effective pore size that has no bearing
9 on removing organics. That organic is a process of
10 absorption, not a physical removal.

11 MR. SHEA: Let me ask the question this way:
12 What's the margin of error on the water that would be
13 injected? Are you saying it's zero?

14 MR. STEWART: I'm saying that we have certain
15 characteristics. We're not going to want any organics to
16 go down there, so --

17 MR. SHEA: I know you don't want that. But I'm
18 just asking: What's the margin of error?

19 MR. STEWART: I've run a plant in Wellington,
20 Colorado. I've never had an exceedance of BTX. The BTX
21 standard is five parts per billion. So we're going to be
22 meeting that kind of water quality.

23 MR. SHEA: And how often in your Wellington
24 plant do you do testing on the water?

25 MR. STEWART: Once a week.

1 MR. SHEA: So it's not on every load that comes
2 in. It's a once-a-week quality control?

3 MR. STEWART: Because it's not a facility that
4 receives load. It is a dedicated facility to a field.
5 So I know exactly what's coming in and what's going out.

6 MR. SHEA: On a once-a-week test?

7 MR. STEWART: Yes.

8 MR. SHEA: Just so we understand, the Cisco UIC,
9 that, with every truck coming in, would be tested.

10 MR. STEWART: Yes.

11 MR. PAYNE: I'm sorry. The Cisco UIC? Is that
12 the same as the Wellington that you were referring to?

13 MR. SHEA: No. No. The Wellington is the one
14 he's presently operating.

15 MR. PAYNE: So what's Cisco? I'm sorry, "Cisco"
16 is a new term.

17 MR. SHEA: Utah. I was just using the
18 geographic location. I like names rather than numbers.

19 So your testimony is that every truck load
20 coming in would be individually tested?

21 MR. STEWART: For certain characteristics,
22 correct.

23 MR. SHEA: And can you outline again what those
24 characteristics are?

25 MR. STEWART: I mean, we'll develop this as we

1 go. But typically, you do a visual inspection. You're
2 going to be looking for surfactants; you are going to be
3 looking for different colors, those characteristics. If
4 you get a suspicious load, then you'd have that diverted
5 off to figure out how that treatment process is going to
6 work.

7 MR. SHEA: But isn't the process of the testing
8 that the operator would put in some container, pull it
9 out and look at it, even though the container itself may
10 contain -- I don't know how many gallons each of the
11 trucks would have.

12 MR. STEWART: It has about 4000 gallons. And
13 absolutely. But that truck's been moving around. That
14 water is very well mixed at that point.

15 MR. SHEA: Okay. But it being well-mixed still
16 could mean, scientifically, that there are materials that
17 the observation and the testing you are proposing to do
18 would miss.

19 MR. STEWART: So that is why you have the
20 multiple barriers to the injection well.

21 MR. SHEA: And with those multiple barriers, at
22 each barrier what's the margin of error that goes
23 through? Independent of your experience at Wellington,
24 when you purchase that equipment, what does the equipment
25 specification say as to error rate?

1 MR. STEWART: It doesn't have an error rate.
2 What happens is that you've got multiple barriers. So,
3 for example, the activated carbon. You are going to have
4 multiple canisters. What you are going to do is test in
5 between each canister. So you always have two backups to
6 the one canister. So that when it gets to the end of
7 that, there are no organics that are left that go down
8 the well. And what you monitor is in between the two
9 canisters. When that one canister is exhausted, it's
10 called a lead-lag-lag. The first lag column becomes the
11 lead column. And then you put in a brand new one at the
12 end of it so that you don't have issues -- or organics
13 going down the well.

14 MR. SHEA: And your testimony is that it's
15 100 percent accurate on every gallon of water that is
16 injected into the well?

17 MR. STEWART: What's your detection limit that
18 you want me to go to?

19 MR. SHEA: Well, you are asking me a question.
20 What I'm asking you is: What's the limit that
21 you are planning --

22 CHAIRMAN JOHNSON: Mr. Shea, it seems to me
23 we're getting nowhere. I think you need to focus your
24 questions on what your issues are. It seems to me you
25 are just fishing around.

1 MR. SHEA: I'm trying to get a scientific answer
2 to a scientific question and he's not giving it.

3 CHAIRMAN JOHNSON: And I think he has given
4 those to you.

5 MR. SHEA: He has?

6 CHAIRMAN JOHNSON: Yes, I believe he has.

7 MR. SHEA: What's the margin of error, then?

8 CHAIRMAN JOHNSON: I think he testified what the
9 process is. And then from that, we can decide whether we
10 think that's adequate for the UIC --

11 MR. SHEA: And you are familiar with the process
12 he's talking about?

13 CHAIRMAN JOHNSON: Mr. Shea, I think we need to
14 move forward.

15 MR. SHEA: I think the citizens of Utah ought to
16 be able to know the quality of the water that's going in
17 the well.

18 CHAIRMAN JOHNSON: I'm telling you: I don't
19 think we're getting anywhere very fast at all.

20 MR. SHEA: Well, that's because the witness
21 isn't answering the question.

22 CHAIRMAN JOHNSON: Mr. Shea, I believe he is.
23 Please, let's try to move forward.

24 MR. SHEA: All right. Let's examine the
25 testimony about the seeps into the Colorado.

1 You testified that you talked to two rangers
2 from the BLM. Is that correct?

3 MR. STEWART: Yes.

4 MR. SHEA: And do you know how many --

5 MR. STEWART: Let me correct that. Not me,
6 personally. My hydrogeologist, Paul Stone, talked to two
7 rangers.

8 MR. SHEA: Do we have the names of those two
9 rangers?

10 MR. STEWART: He does.

11 MR. SHEA: But you don't?

12 MR. STEWART: I don't have it with me. I can
13 get those.

14 MR. SHEA: What's the square mile area that they
15 have to cover as rangers -- or do you know how many
16 rangers there are for BLM in the Moab district?

17 MR. STEWART: No.

18 MR. SHEA: There are two. There's over
19 2 million square acres. And you are expecting --

20 CHAIRMAN JOHNSON: Mr. Shea, "square acres," is
21 that a technical term?

22 MR. SHEA: It's redundant. Excuse me.

23 CHAIRMAN JOHNSON: Oh, okay. Thank you.

24 MR. SHEA: In trigonometry, you can have other
25 than a square acre. But we'll accept that it's square.

1 I'm just trying to find out --

2 CHAIRMAN JOHNSON: I'm sorry, Mr. Shea. I
3 apologize for that. But I'm getting a little frustrated
4 at --

5 MR. SHEA: We've sat here for an hour-and-a-half
6 as they put on their testimony. I've had two days to
7 look at the record. And I'm simply trying to explore the
8 factual evidence this Board is going to depend on.

9 Two rangers testifying about whether there are
10 seeps or no seeps on the Colorado River is ridiculous.
11 And I testify on that as a former director of the BLM,
12 where they don't have enough time to do the things they
13 need to do. And it should not be a basis for the Board
14 to make a decision about the potential for seeps from
15 this injection well going into a national river.

16 CHAIRMAN JOHNSON: And we are concerned about
17 getting information for the UIC. And I would like to get
18 that information out.

19 I'm just saying I don't think that the questions
20 that you are asking along that line over and over again
21 are getting us anywhere. And I would appreciate if we
22 could get all the information on it.

23 MR. SHEA: And the potential for a seep from the
24 well you are approving is not a legitimate area of
25 inquiry for the application?

1 CHAIRMAN JOHNSON: No, I didn't say that.

2 Please, let's move forward. Go ahead.

3 MR. SHEA: Let's explore how the determination
4 was made by this witness as an expert that there are no
5 seeps coming from this area into the Colorado. And other
6 than two overworked BLM rangers, I don't see any other
7 evidence.

8 MR. STEWART: Can I answer that?

9 CHAIRMAN JOHNSON: Go ahead, Dr. Stewart.

10 MR. STEWART: Paul Stone walked the canyon
11 himself as a baseline. He walked the entire portion that
12 was negotiated with Fish and Wildlife as to what they
13 were concerned about. And so he visually walked it. We
14 have pictures of that. We have pictures of the whole
15 thing.

16 And then he interviewed the two rangers and
17 asked them if they were aware of any seeps. And they
18 said no. So I assume that they, too, have been in that
19 canyon and would know about that. But I don't have any
20 idea. So we physically walked the canyon. There are no
21 seeps in the Wingate.

22 MR. SHEA: Who is Paul Stone?

23 MR. STEWART: He is my hydrogeologist. He's a
24 professional geologist, and he's my hydrogeologist
25 internally. He works for me.

1 MR. SHEA: When you say you walked the Westwater
2 Canyon, would you agree there are parts you can't walk
3 because of the flow?

4 MR. STEWART: Yes. But he could observe those
5 areas that he couldn't walk. And again, he's looking at
6 the Wingate Formation and he's not finding any seeps.

7 MR. SHEA: Okay. In the first part of our
8 letter that the Board received this morning, it talks
9 about the water pressure rising as the injection occurs
10 outside the particular formation that Mr. Stone examined.

11 Do you agree that that's a legitimate concern?

12 MR. STEWART: Are you asking me or the Board?

13 MR. SHEA: I'm asking you. You are the witness.

14 MR. CLAWSON: Mr. Chairman, this witness didn't
15 testify about the water pressure raised in Living Rivers'
16 letter. Mr. Allin, to my left, will be testifying to
17 that. Maybe he'd like to hold the question for him.

18 MR. SHEA: I'll hold it until Mr. Allin
19 testifies. But I would like to reserve the right to come
20 back with this witness if we don't get a complete answer
21 out of Mr. Allin.

22 CHAIRMAN JOHNSON: Please move forward.

23 MR. SHEA: All right. For the Board, do you
24 consider the water that is being injected into this well
25 you are applying for to be tributary water or

1 nontributary water?

2 MR. STEWART: Nontributary.

3 MR. SHEA: And the basis of that judgment is?

4 MR. STEWART: In Colorado, where a lot of this
5 water comes from, that basin, under House Bill 1303 and
6 Senate Bill 165, has been classified as "nontributary."

7 MR. SHEA: When you say "House" and "Senate," is
8 that the House and Senate of Colorado?

9 MR. STEWART: Yes.

10 MR. SHEA: But not of Utah?

11 MR. STEWART: Yes.

12 MR. SHEA: And some of this water would be
13 coming from Utah?

14 MR. STEWART: Correct. They do not have a term
15 "tributary" or "nontributary" in Utah.

16 MR. SHEA: Excuse me. Are you familiar with the
17 1923 Colorado Compact?

18 MR. STEWART: Very familiar.

19 MR. SHEA: And that is not used as --
20 "tributary" or "nontributary" -- as a distinction?

21 MR. STEWART: No. They use "surface flows" and
22 "tributary flows," but they do not classify. Colorado is
23 the only state that classifies their water and gives it a
24 statistical valuation as to "nontributary." They have
25 "tributary," "nontributary," and "not nontributary."

1 MR. SHEA: And are you familiar with the state
2 engineer of Utah's effort to categorize and classify the
3 groundwater in the state of Utah?

4 MR. STEWART: Yes.

5 MR. SHEA: And has he examined this area of the
6 Uinta Basin for that purpose?

7 MR. STEWART: Not to my knowledge.

8 MR. SHEA: So we could not answer definitively
9 whether this is, using the Colorado term, "tributary" or
10 "nontributary"?

11 MR. STEWART: It most likely is nontributary,
12 because the oil wouldn't be there if it were tributary.

13 MR. HAROUNY: Mr. Shea, are we talking about the
14 Uinta Basin now or Paradox Basin?

15 MR. SHEA: I'm talking about both. And if the
16 Board would like, we can ask the same question for both
17 areas.

18 Can you answer the question for the two basins?

19 MR. STEWART: I have not looked at the specific
20 geology in Utah as it relates to produced water.

21 MR. SHEA: And Mr. Chair, the only reason I
22 raise this is the Governor yesterday in Las Vegas before
23 the National Governor's Association was engaged in a
24 fairly active debate about the Colorado River Compact,
25 the upper state -- upper basin states and the lower basin

1 states. And I think questions about whether it's
2 tributary or nontributary are going to become very
3 important policy questions that, admittedly, are not
4 before the Board but will be impacted by the decisions
5 the Board makes. And I think there are unknowns there
6 that would warrant, at least, further inquiry of the
7 state engineer as to his studies or lack thereof for the
8 two basins that are being discussed here.

9 And if we don't do it, I would conjecture with a
10 reasonable degree of certainty that other states will be
11 doing it because of the impact it may have or may not
12 have on the Colorado River.

13 MR. JENSEN: I guess, Mr. Shea, I don't
14 understand why that has any application to the
15 application that's before us. Where the water comes
16 from, that's not before us.

17 MR. SHEA: Let me try, if I might, and I
18 appreciate it's taking the Board's time.

19 As I understand from practicing water law, there
20 are allocations under the 1923 Colorado River Compact
21 from each of the Colorado states, so to speak, upper
22 basin and lower basin. The estimate in 1923 was
23 significantly off the mark. And so we are now in a time
24 of rapid population growth where, particularly, the lower
25 basin states are having -- are making demands on

1 additional flow. And that flow will come from areas that
2 are considered to be, quote, tributary, meaning that they
3 would normally flow into and support the Colorado River
4 system.

5 If they are noncontributory (sic) then that's
6 not a question. But it's a question that is going to be
7 paramount in importance as we renegotiate the upper basin
8 section.

9 MR. JENSEN: I think you've made your -- you
10 made your point. Appreciate that. But that's going
11 to -- when and if that comes, that's going to be in front
12 of a different body than this body relative to injection
13 well.

14 MR. SHEA: Correct. Although this body is
15 making a decision on how that water -- where that water,
16 so to speak, is going to be stored. And if, in fact,
17 it's going to be recycled, then there's going to be a
18 question of ownership.

19 MR. JENSEN: That's not for this Board.

20 MR. SHEA: But if you are approving the storage
21 of the water, who is going to determine the ownership?

22 MR. JENSEN: That is not before this Board. We
23 don't have the ability to make that determination. So
24 let's move on.

25 MR. JOHNSON: Mr. Chairman, if I might just

1 interject something, maybe for the benefit of the Board
2 as this whole matter proceeds. As we've gone through a
3 number of issues that this witness has been questioned
4 about, there's been some debate about whether it's really
5 in front of the Board or not. And maybe if each of the
6 parties, especially when those discussions arise, will do
7 their best to tie it to the UIC rules or the statutes
8 which govern this proceeding just to aid the Board in
9 understanding where that line of questioning and the
10 testimony you are eliciting fits within the analysis or
11 doesn't fit within the analysis.

12 MR. SHEA: Can you include the EPA regulations
13 on that?

14 MR. JOHNSON: I'm not trying to tell anybody
15 what their argument should be as to whether it's germane
16 or not. I'm just asking that those arguments be made for
17 the Board's benefit. So there may be disagreement among
18 the parties what's material or not. But if an effort can
19 be made to articulate how it is that each of the parties
20 feels that the question fits within what is in front of
21 the Board, I think that would aid the Board in its
22 determination.

23 MR. SHEA: I appreciate that. And we'll
24 certainly try to do that. I really have just three more
25 inquiries.

1 The first inquiry that's left is -- I have to
2 say I'm a belt-and-suspenders person when it comes to
3 natural resources.

4 And I'd like to have the witness -- if there's
5 \$7 million available, what's the problem, for matters of
6 monitoring the UIC well, of creating three monitoring
7 wells downslope, just to be an early warning system of
8 any seepage?

9 MR. STEWART: How far away are these? Are they
10 on BLM land? Are they on private land? How deep are
11 they?

12 MR. SHEA: From your map, there is no private
13 land they could be on, so they'd be on BLM land.

14 MR. STEWART: If we're doing it at the outcrop,
15 a quarter mile back from the outcrop, and it's a 100-foot
16 well, there is no problem with that.

17 MR. SHEA: Well, it would have to be deeper than
18 a 100-foot well because you are down at 1700 feet.

19 MR. STEWART: At the well we are, at the
20 injection well, but it slopes upward. So it eventually
21 hits the canyon wall, and you are not as deep there, so.

22 MR. SHEA: You'll agree -- and again, Mr.
23 Clawson has told me that Mr. Allin will be talking about
24 the geology. But it's a disconformed (sic) area to the
25 east of the well. Is that correct?

1 MR. STEWART: That's a question for Mr. Allin.

2 MR. SHEA: Okay. I'll wait on that question,

3 then.

4 And again, I may have missed this, but when will

5 the filtration process be operational?

6 MR. STEWART: "Which filtration?"

7 MR. GILL: What was the answer to that? I

8 didn't hear it.

9 MR. STEWART: Which filtration.

10 MR. SHEA: Why don't you describe for me the

11 different filtration process and then give a date at

12 which they'll be operational.

13 MR. STEWART: Since we are asked to tie this to

14 the injection well, that filtration is available today.

15 I have it. It's available. I can't install it until I

16 get the Conditional Use Permit from the County. But it's

17 available today.

18 MR. SHEA: I wasn't questioning its

19 availability, I was questioning its operation.

20 Assume for a moment --

21 MR. CLAWSON: Mr. Chairman, he's asked this

22 question. It's been answered. He can't install it

23 because he's waiting for the CUP permit.

24 MR. SHEA: Excuse me. With cross-examination, I

25 get to have some latitude.

1 And assume for a moment that January 1 is the
2 day that Grand County gives their permit. My question
3 is: When would the filtration processes be operational?

4 CHAIRMAN JOHNSON: Okay. Let's answer when the
5 filtration process would be available. I think he's
6 already answered, or described the filtration itself.

7 So when will it be available?

8 MR. STEWART: They are available today. It
9 would be operational, probably, within ten days of
10 obtaining the operational permit from the UDOGM, as well
11 as the operational permit from the County.

12 MR. SHEA: Thank you. That's all I needed to
13 know.

14 Second question: With the frac fluids, which
15 you've indicated you would not inject into the well, you
16 said that you would store them in a side tank that was
17 capable of holding one hauling truck.

18 And where would they go after they had been
19 analyzed and confirmed as frac fluids?

20 MR. STEWART: Well, most likely -- we can treat
21 frac fluids. Fracking is purely organic. We can treat
22 them. Typically, you have to oxidize them before you do
23 that. So you would oxidize it with a bleach. And then
24 you'd send it through the same process.

25 MR. SHEA: And then it would be injected?

1 MR. STEWART: The organics would be removed. So
2 only thing that's being injected, again, are the salts.

3 MR. SHEA: I was unclear when you said earlier
4 that there'd be no frac fluids put in. You are saying
5 frac fluids treated would be injected?

6 MR. STEWART: If they can be treated; otherwise,
7 they'll go to another disposal facility.

8 MR. SHEA: Yeah. But you did say that they
9 could be treated?

10 MR. STEWART: Yes, I believe they can. It is
11 not going to be our practice to take frac fluids.
12 Sometimes they get involved with the produced water, so
13 you've got to have a plan for that. We do have a plan
14 for that. It's to remove the organics. If I remove the
15 organics, the characteristic of the frac fluid is then
16 just a high TDS water.

17 MR. SHEA: And if you can't, where would they
18 then go?

19 MR. STEWART: We have contracts with other
20 disposal facilities that don't inject the water. So
21 Danish Flats is an example. They have an evaporation pit
22 there.

23 MR. SHEA: Okay. And final question -- and this
24 may go to Mr. Allin. But is there any way, on a daily
25 basis, you could do groundwater flow tests or cross-hole

1 tracer tests?

2 MR. STEWART: That would be a question for
3 Mr. Allin.

4 MR. SHEA: Okay. Thank you.

5 CHAIRMAN JOHNSON: Is that all, Mr. Shea?

6 MR. SHEA: Just one second. If I may, one last
7 question.

8 If there is a delay in the Grand County Zoning
9 Commission giving you approval, will you begin injecting
10 water into the UIC before you get approval from Grand
11 County?

12 MR. STEWART: No. We have to have an operating
13 permit from Grand County as well.

14 MR. SHEA: Okay. Thank you. That's all.

15 CHAIRMAN JOHNSON: Does the Board have any
16 questions for Dr. Stewart?

17 Go ahead, Mr. Harouny.

18 CROSS-EXAMINATION

19 BY MR. HAROUNY:

20 MR. HAROUNY: Dr. Stewart, you have done some
21 hydrology work, or you have a hydrologist on your staff,
22 I believe?

23 MR. STEWART: Yes.

24 MR. HAROUNY: Have you looked at hydrodynamics
25 uphole, shallower, in certain zones that may contain

1 fresh water? Any kind of aquifer studies done in that
2 area in proximity to the anticipated zone where you're
3 going to be injecting?

4 MR. STEWART: Really, that's a question for Dave
5 Allin. But we have had Dave look at that, then the
6 County hired Dr. Downs to also do that. And Dr. Downs
7 concurred with Mr. Allin.

8 MR. HAROUNY: I'm very familiar with the area,
9 and I've, in the past, been involved in the area. And
10 I've known of fresh water existence and stratas deeper
11 than seven, 800 feet, so.

12 MR. STEWART: Yes.

13 CHAIRMAN JOHNSON: Any other questions from the
14 Board?

15 Mr. Clawson, do you have redirect?

16 MR. CLAWSON: I do. I have just a couple of
17 questions.

18 REDIRECT EXAMINATION

19 BY MR. CLAWSON:

20 MR. CLAWSON: There's a concern about whether or
21 not organics can be injected into the hole.

22 Will Westwater test for the development of gas
23 in the formation at the well site?

24 MR. STEWART: Yes.

25 MR. CLAWSON: So it would be a constant

1 monitoring on whether or not gas is being formed in the
2 formation?

3 MR. STEWART: Correct.

4 MR. CLAWSON: And has the state of Utah state
5 engineer agreed to your process, your plan?

6 MR. STEWART: Which plan?

7 MR. CLAWSON: Well, the injection of water.

8 MR. STEWART: Oh, yes, uh-huh. It's purely --
9 it's a Class II injection well. So whether it's
10 tributary or not tributary, it's immaterial to a Class II
11 injection well. It's coming from a petroleum operation,
12 goes back into the formation.

13 MR. CLAWSON: That's all I have.

14 CHAIRMAN JOHNSON: Okay. Would you like to move
15 forward with Mr. Allin then, Mr. Clawson?

16 MR. CLAWSON: Sure. I'd like to call my next
17 witness.

18 DAVID L. ALLIN,
19 having been first duly sworn,
20 was examined and testified as follows:

21 DIRECT EXAMINATION

22 BY MR. CLAWSON:

23 MR. CLAWSON: Would you please state your full
24 name and address for the record?

25 MR. ALLIN: David L. Allin. My address is

1 475 --

2 MR. GILL: Would you hold that very close.

3 MR. CLAWSON: Please state your full name and
4 address for the record.

5 MR. ALLIN: David L. Allin. My address is 475
6 Seasons Drive, Grand Junction, Colorado, 81507.

7 MR. CLAWSON: And what's your affiliation with
8 Westwater Farms, LLC?

9 MR. ALLIN: I was -- I'm engaged as a consultant
10 to them through a company that is my primary employer.
11 I'm farmed out as a consultant to evaluate their project
12 and file necessary permits on their project.

13 MR. CLAWSON: Could you please provide a brief
14 summary of your education and your experience?

15 MR. ALLIN: I received a bachelor of science
16 degree in geology from the University of Wyoming in 1976.
17 And since that time -- or actually before that time, I
18 began work here in Salt Lake City for Petroleum
19 Investment Company in 1975 as an exploration manager and
20 evaluator of BLM oil and gas leases. The proprietor of
21 that company died in 1977.

22 Then I was engaged to liquidate his estate for
23 the trust department of Zions Bank. And since it
24 involved several hundred thousand acres of both state and
25 federal oil and gas leases, it was a fairly significant

1 project for the trust department at Zions that was well
2 outside their purview of expertise. So I was involved in
3 that.

4 After that, I was involved in -- and during that
5 time -- involved in a private company called Petro Lease
6 Co, that, with the assets of the estate I was involved in
7 from Petroleum Investment Company and John Ogerson
8 (phonetic), we merged those elements with subsidiaries of
9 Pennzoil, Marathon, and Superior.

10 After that, I formed Rocky Mountain Exploration
11 Company. We generated prospects throughout the Rocky
12 Mountain region -- primarily in Utah, though. That
13 company was merged with a Houston-based company in 1980.
14 And since that time, I've worked for more local Utah
15 companies, Amber Oil & Gas being one. They had assets in
16 the Greater Cisco field, where the Harley Dome 1 well is
17 still within that field, that designated field. And I
18 had my own leases, which I just sold last year, which
19 operated in the Greater Cisco field.

20 And my levels of experience related to the area
21 have been a 35-year time frame, basically, with this
22 field and the Uintah Basin and Grand County.

23 MR. CLAWSON: Do you have hold any licenses and
24 are a member of any professional organizations?

25 MR. ALLIN: Yes. I am licensed by the Utah

1 Department of -- what is it -- Occupation and
2 Professional License -- or Office of Professional
3 Licensing as a petroleum geologist. I was granted that
4 license in 2003.

5 I'm also a member of the American Association of
6 Petroleum Geologists. I'm certified by a subsect of that
7 group called the CPG as a Certified Petroleum Geologist.
8 And I've been certified by that body since 1983 as a
9 petroleum geologist.

10 I also belong to the Utah Geological Association
11 and the Utah Association for Professional Landmen.

12 MR. CLAWSON: Are you familiar with the
13 hydrogeology of the Wingate Sandstone in southeastern
14 Utah?

15 MR. ALLIN: Yes. And the basis for that has
16 been fairly extensive study since 1999, where I was
17 involved in the exploration of, mainly, Middle Jurassic
18 sandstones for oil and gas reserves in the Flat Rock
19 field and Seep Ridge fields of Uintah County. That
20 involved drilling multiple wells to these formations at
21 depths there near 12,000 feet, and evaluating a total of
22 50 square miles of 3D seismic data coverage that I was a
23 principal investigator on.

24 MR. CLAWSON: I'd ask that Mr. Allin be
25 recognized as an expert for the present matter for

1 purposes of geological interpretation, geohydrological
2 engineering, and water injection projects.

3 CHAIRMAN JOHNSON: Ms. Lewis, any questions or
4 objections?

5 MS. LEWIS: No objections.

6 CHAIRMAN JOHNSON: Mr. Shea?

7 MR. SHEA: I didn't hear him testify on his
8 experience on the hydrology side.

9 Could you clarify what experience he's had on
10 the hydrology involved in the injection wells?

11 MR. ALLIN: Yes. I had direct participation in
12 filing UIC permits, both Class II and Class I in the case
13 of a well called Blue Bench over by Duchesne, Utah, a
14 number of years ago.

15 I also had applied for another EPA Class II
16 permit for a Frank Arroches (phonetic), a water well
17 company owner in Uintah County at Ft. Duchesne.

18 More recently, I just obtained a UIC permit from
19 EPA for the Seep Ridge WIW 1 in the Seep Ridge field in
20 Uintah County from EPA. That was on behalf of a partner
21 of the company I work for called Summit Energy.

22 In the meantime, I'm to a final permit stage on
23 another UIC permit with EPA, Region 8, for the -- another
24 well in Uintah County on property that Del Rio Resources
25 operates, and that well would be designated the DNL E

1 Gusher Disposal 1 (phonetic).

2 I also published in Utah Geological Association
3 guidebooks on the -- a very unique field that involves
4 hydrodynamic flow, displaced aquifers in the Upper Valley
5 field in Southern Utah, and published on the Kaiparowits
6 Basin hydrogeology in the Oil & Gas Journal.

7 MR. SHEA: I have no objection to him being an
8 expert on the application process. But I would object to
9 him being considered an expert on the operations side of
10 the hydrogeology aspects of the UIC well. He's certainly
11 an expert on how you apply for permits, but he's not an
12 expert on how you operate those permits once they're
13 granted.

14 CHAIRMAN JOHNSON: Mr. Clawson.

15 MR. CLAWSON: I'm not asking he be admitted as
16 an expert for the operational aspects. I mean, I'm not
17 sure I understand the distinction. For purposes of this
18 proceeding, they just seem mirrored to me.

19 CHAIRMAN JOHNSON: Does the Board have any
20 questions or objections?

21 MR. JENSEN: It seems to me that Mr. Shea asked
22 the question that he found the questions to be lacking in
23 hydrology. And now the responses that came seem to be in
24 terms of applying for UIC --

25 MR. CLAWSON: -- UIC application as opposed to

1 hydrology.

2 MR. JENSEN: -- as opposed to hydrology. And I
3 think that's what the issue --

4 MR. CLAWSON: Okay, now, I understand.

5 Can you describe your experience when it comes
6 to -- either in your education or your experience -- when
7 it comes to hydrology?

8 MR. ALLIN: Yes. The distinction is really just
9 a matter of the difference between what fluid occupies
10 the core space in an aquifer or an oil and gas reservoir.
11 If the core space is occupied primarily by water, then
12 it's a hydrology project. If it's primarily occupied by
13 oil and gas or hydrocarbons, then it's primarily an oil
14 and gas or petroleum exploitation application of my
15 experience.

16 As far as evaluating what needs to be assembled,
17 what needs to be submitted for UIC permits for
18 consideration by the regulators, I have to have an eye
19 for what characterizes the attributes of the formation,
20 its contents, whether or not there's hydrodynamic flow
21 involved, whether or not the formation -- how it behaves
22 under injection stress, how it behaves under production
23 stress, either one.

24 From the standpoint of trying to make a
25 distinction, it's really a matter of a focus on just

1 contents of the formation. Because the -- as far as my
2 experience with it, I probably have much more experience
3 just from processing these permits dealing with the
4 questions that come up relating to safe disposal of
5 produced water in Class II wells, or in the case of a
6 Class I well, how that should be handled, whether or not
7 anything's going to migrate out of zone.

8 So it really boils down to, although I'm not a
9 degreed engineer, I have extensive experience in
10 evaluating these very specific issues that relate to
11 migration of fluids within reservoirs; and so therefore,
12 you know, as far as my experience versus, probably, one
13 in another 50 consulting petroleum geologists, I probably
14 have more experience than, like I say, one in 50.

15 CHAIRMAN JOHNSON: Mr. Shea, does that address
16 your concerns?

17 MR. SHEA: Well, again, I'm having a hard time
18 understanding where, as a consultant, his work stops and
19 where the operation begins, and whether or not -- from
20 the Board's perspective -- the basis of his expertise is
21 sufficient to make an expert judgment on the dynamics
22 that the Board is authorizing. He's good, certainly, on
23 paper. He's done a lot of applications. But what
24 happens after that paper is filed and approved by the
25 Board, it seems to me is within the purview of the Board

1 in approving a UIC application. And I don't see him
2 having expertise on that.

3 CHAIRMAN JOHNSON: Go ahead, Mr. Harouny.

4 MR. HAROUNY: Mr. Clawson, is there a reason why
5 a hydrologist, a certified hydrologist, wasn't present,
6 or the person that is employed by the organization is not
7 here?

8 MR. CLAWSON: We thought we could provide the
9 Board with the testimony that it needed by using
10 Mr. Allin. I mean, I can understand Mr. Shea's concern
11 about the operations after approval. But it seems to me
12 that that is a separate question from the Board's
13 approval of the application itself. I mean, in other
14 words...

15 (Mr. Clawson consulted with his experts.)

16 MR. CLAWSON: You know, when it comes to the
17 actual approval of the application and whether or not
18 this formation will handle the fluids and be able to
19 handle the pressures and be able to take the volumes of
20 the fluids and such, I think he's qualified to answer
21 those questions. He's prepared this permit. He's -- and
22 other permits and has experience doing that. And he
23 knows the questions to ask and how to resolve them.

24 When it comes to the operations of the well
25 itself, I mean, that's more of a staff position for

1 Westwater Farms. You know, that has to be operated
2 within the parameters that the Board and Division
3 approve. I'm not sure that that's all that important.

4 CHAIRMAN JOHNSON: Okay. Mr. Shea, I believe
5 you said you don't have any objections to Mr. Allin being
6 recognized as an expert in the field of geology.

7 MR. SHEA: Certainly.

8 CHAIRMAN JOHNSON: Okay. If we get into
9 questions, then, that require opinions on the hydrology,
10 operational hydrology, Mr. Shea, if you've got objections
11 to those questions, please raise them at that time and
12 we'll deal with them then.

13 MR. SHEA: If I could, just for point of
14 clarification: I take what Mr. Clawson has said is that
15 he prepares the application. When the application is
16 successful, he's ended. So if anything has gone wrong or
17 his predictions were incorrect, he would not be able to
18 testify on that?

19 CHAIRMAN JOHNSON: I'm not sure I understand
20 your question, Mr. Shea.

21 MR. SHEA: As I understand what he's testified
22 to is he prepares the application. He tests all the
23 hypotheses necessary under Type II injection wells.

24 When that is over and done with, the Board has
25 approved it, if anything has gone wrong on either the

1 geology side or the hydrology side as to the hypothesis
2 he tested, he's not involved. He can't testify about
3 that.

4 And I'm just saying I think the Board needs to
5 have some examination of that by somebody who has had
6 experiences, both with success -- which we hopefully will
7 have -- but also with failure. You know, where did the
8 application go wrong in predicting an anomaly that was a
9 mistake?

10 MR. GILL: Let me make sure I understand. The
11 witness testified that there is pore space. And pore
12 space can be completely filled with petroleum products,
13 or it can be completely filled with water, or a
14 combination of both. Typically, it's a combination of
15 both. That is the reason you have produced water, is
16 when they're both present.

17 I don't see the clear demarcation between an
18 expert in petroleum geology and the reaction of the
19 formation because substances are removed or injected.
20 That is a very subtle difference in terms of what
21 hydrologists would testify or petroleum geologists would
22 testify. Hydrology geologists or petroleum geologists, I
23 don't see the difference at this point because -- and so
24 trying to limit him from testifying...

25 Why don't we let him testify, and then at the

1 end of that, we can put weight and materiality filters on
2 what he testifies to, if they're lacking or if it would
3 take another expertise. But at this point, the crossover
4 of those two skill sets doesn't seem to make a difference
5 to me.

6 MR. HAROUNY: Mr. Shea, as you are well aware,
7 in order to become a hydrologist, you have to go through
8 geology first --

9 MR. SHEA: Correct.

10 MR. HAROUNY: -- basically. And there's very
11 little difference at the end, as far as speciality and
12 how you become a hydrologist. You first and foremost
13 have to become a geologist, and then you choose your
14 specialty as a geologist, a hydrologist. I've seen named
15 recognitions as such -- geologist, hydrologist. It's a
16 specialty, but it does not completely differentiate
17 between two different regimes, if you will.

18 MR. SHEA: But I certainly --

19 MR. GILL: The issues are basically:
20 Permeability, porosity, drainage area, or the area in
21 which the produced water could move toward over time.

22 MR. SHEA: The only thing --

23 MR. PAYNE: Mr. Chairman, may I?

24 CHAIRMAN JOHNSON: Mr. Payne, go ahead.

25 MR. PAYNE: I'd like to move forward. I think

1 it's not Mr. Shea that we need to satisfy, it's this
2 Board.

3 I'd like to make a motion we accept this witness
4 as an expert and move this forward, noting Mr. Shea's
5 concern. But let's move this.

6 MR. SHEA: Could I just raise one final --

7 MR. PAYNE: No. I would like to move this
8 forward.

9 CHAIRMAN JOHNSON: Okay. Is there a second?

10 MR. HAROUNY: I'll second it.

11 CHAIRMAN JOHNSON: Any discussion among the
12 Board?

13 All those in favor say "Aye."

14 THE BOARD: Aye.

15 CHAIRMAN JOHNSON: Anyone opposed?

16 We'll recognize Mr. Allin as an expert in
17 geology and hydrology.

18 If you've got objections, if we get into any of
19 those questions on that portion of hydrology you are
20 concerned about, Mr. Shea, as it applies to the UIC
21 application, please raise them at that time. The Board
22 will take that into account.

23 MR. SHEA: It's simply a question of fluid
24 dynamics.

25 CHAIRMAN JOHNSON: Go ahead, then, Mr. Clawson.

1 MR. CLAWSON: Thank you, Mr. Chairman.

2 I'd refer you to Exhibit No. 7.

3 Have you examined this exhibit and are you
4 familiar with it?

5 MR. ALLIN: Yes.

6 MR. CLAWSON: Can you please tell us what this
7 exhibit is and why it's important?

8 MR. ALLIN: This exhibit is a geologic map of
9 most of Grand County and a little bit of southern Uintah
10 County and a little bit of northern San Juan County.

11 What it depicts is -- in very colorful fashion,
12 it's quite busy -- but it color codes the outcrop bands
13 of various ages of rock throughout the county. It also
14 has a township and range grid on it. And the townships
15 are about three-quarters of an inch on the side, and they
16 are visible through there as a checkerboard or a gridded
17 pattern.

18 There is also topographic contour lines on it,
19 which indicate the relative elevations of the ground
20 surface in addition to the color coding, which indicates
21 what the formation is at that particular elevation on the
22 outcrop.

23 In general, we're looking at -- towards the
24 north end of the map, the brighter colors -- the orange
25 is tertiary rocks. The rocks of the Uinta Basin

1 outcropping high on the top of the Book Cliffs, that's
2 the Wasatch and Green River formations, including down
3 into the yellow band.

4 There's a large green band in the northern half
5 of this document or this figure. That's part of the
6 upper cretaceous. The lighter band of green is mainly
7 the mancos shale outcrop along the band below the foot of
8 the Book Cliffs. This is all a relatively flat area.

9 But in general, then, coming into the eastern
10 and southern parts of the map, there's another dark green
11 band, representative of about the Dakota Sandstone and
12 Cedar Mountain formations. These are the first aquifers
13 and/or petroleum-bearing porous formations beneath the
14 mancos shale.

15 Then there's another band below that, a dark
16 gray pretty much on this. It's the Morrison Formation.
17 It's generally a confining bed. It's mainly shale and
18 plastic, high clay content shale beds.

19 Then below that, there are some of the more
20 porous elements of the Middle Jurassic formations. These
21 are bands represented here going out into a dark brown
22 color. These are mainly composed of two types of beds.
23 There's basically fossilized sandstones typical of the
24 Entrada Sandstone and the Wingate Formation. And there
25 are also fluvial tile beds, or beds that were laid down

1 by rivers, like the Kayenta Formation.

2 Below that, in the very southern part of the
3 map, you actually see some of the outcrops of painted
4 blue on this particular figure. But that's Permian and
5 Pennsylvanian rock.

6 Now, when the whole picture is put together,
7 what it shows is that -- and what I tried to depict by
8 placing arrows, red arrows, on this map -- is, in
9 general, water movement within the confined aquifers of
10 the, what's called the Glen Canyon group, which -- if all
11 the components of it are present, including the Navajo
12 Sandstone, the Kayenta Formation, and the Wingate
13 Formation -- or the Wingate Sandstone.

14 The reason this particular map was put together
15 was primarily to satisfy the Grand County Planning
16 Commission that activities at the Harley Dome site and
17 related to this injection well permit would be isolated
18 from and not pose any threat to the watersheds that serve
19 the populated areas of Grand County, which are primarily
20 the Spanish Valley and Castle Valley areas, because they
21 use -- and they know they use -- the lower parts of the
22 Glen Canyon group as parts of their water supplies.

23 And so what this picture shows is, for one
24 thing, is that in general the water movement in the
25 confined aquifers in the Glen Canyon group -- or the JTr,

1 the way it's labeled on this figure -- is that water
2 movement is northward from the Uncompahgre Uplift, which
3 is the brown/black areas. And it's labeled on here just
4 north of the -- on the east side of the diagram. And
5 also, just beyond where the Colorado River is labeled in
6 white -- so you can kind of see it against the dark
7 background -- well, that dark background that's painted
8 on there is the outcrop of the Kayenta Sandstone. And
9 there's a large outcrop band up in that area above the
10 river level.

11 In general, it's showing that these outcrops get
12 younger as they go northward. The elevations decrease
13 and increase. But in general, all of the beds are
14 dipping. Generally at the very far right-hand edge of
15 this figure, they're dipping mainly northward. But in
16 general, everything beyond that across the Uncompahgre
17 Uplift is dipping northwesterly. So there's a tilt on
18 all of the formations involved, porous, or nonporous,
19 confining beds, and aquifers alike. They are all tilted
20 in the Harley Dome area to the northwest. And in
21 localized areas, due to wrinkles in the structure, which
22 are kind of too small to show on a scale, this scale of
23 map, there is a general tilt of everything to the north
24 or northwest.

25 It's very similar from the La Sal Mountains,

1 which appear with these very light-colored dots down in
2 the far southeast or far lower right corner of this
3 figure, and it shows a couple of arrows emanating from
4 those areas. That's the top of the La Sal Mountains.

5 MR. CLAWSON: Let me interrupt you.

6 How do you know that the water flows north?

7 MR. ALLIN: The water flows north because of the
8 recharge area being on the upland areas of the
9 Uncompahgre Uplift in western Colorado. The water enters
10 into the formations. They are dipping northward. It
11 simply follows on a gravitational flow. And once it gets
12 into a confined aquifer position, once it gets past the
13 canyons of the Colorado River and becomes confined, then
14 the water flow continues northward, mainly because
15 there's lower pressures that have been measured that
16 isn't shown on this map in wells that I've cataloged in
17 part of my research for the background material that's
18 submitted with the permit. I have to know what the
19 relative water formation pressures are in a single
20 aquifer over a broad area in order to predict which way
21 water or hydrocarbons are going to be moving in these
22 porous zones.

23 MR. CLAWSON: Let me ask you: Is the subject
24 well site indicated on this map?

25 MR. ALLIN: Yes. The subject well site is

1 indicated on the right-hand side in about the upper half.
2 "Harley Dome Site" with a little black circle, a heavy O,
3 is where the well site is.

4 MR. CLAWSON: Okay. I'd like to refer you to
5 Exhibit -- well, are you done on Exhibit 7?

6 MR. GILL: I can't see it. I see it now.

7 CHAIRMAN JOHNSON: Let's move ahead.

8 MR. GILL: Wait a minute.

9 MR. SHEA: It's just above the arrow.

10 MR. GILL: I thought you were south of the
11 Paradox Fold. You are north of it. I'm fine.

12 MR. CLAWSON: Okay.

13 Continue.

14 MR. ALLIN: And that is the only key element I
15 wanted to make -- after trying to get everybody oriented
16 to what they are looking at here -- is that the key
17 elements that were important to Grand County with their
18 developed watershed versus the undeveloped one in the
19 Harley Dome area, is that these things are isolated and
20 segregated very completely by two major geological
21 features that cross through this map. One is the north
22 margin of the Paradox Fold and Fault Belt where it meets
23 the Uncompahgre Uplift.

24 There's a large boundary fault in this area and
25 a major synclinal structure called the Savior's Wash

1 syncline. This forms a barrier from anything going on in
2 the Uncompahgre Uplift, Uinta Basin aquifer, from
3 anything happening in the southern part of the map, which
4 is the aquifer related to the La Sal Mountains and the
5 valleys in the Moab area.

6 There's a second barrier, which you can see it's
7 marked as a barrier in the southern half of map in a
8 heavy dot-dashed line, similar to what was put on the
9 Savior's Wash syncline. But this is a salt wall barrier,
10 which is actually continuous from the east margin of the
11 map in a northwesterly direction through Sinbad Valley,
12 Fisher Valley, then Salt Valley, which is within Arches
13 National Park. So there's two elements that eliminate
14 and protect the entire area as far as the subsurface
15 aquifers from being connected.

16 MR. CLAWSON: Now I refer you to Exhibit No. 8.
17 Have you examined this exhibit and are you familiar with
18 it?

19 MR. ALLIN: Yes.

20 MR. CLAWSON: Could you please tell us what this
21 exhibit shows us?

22 MR. ALLIN: This exhibit shows two stratigraphic
23 columns, which are basically depictions of the rock
24 layers in two areas. One is at the underground injection
25 control, or UIC permit location at Harley Dome, and this

1 is from outcrop mapping done by the US Geological Survey.
2 And then -- so that's the stack at Harley Dome.

3 On the left side of the picture is mapping that
4 was done by the Utah Geological Survey, and it's more
5 representative of the stack of rock in the Moab and Salt
6 Valley Anticline/Arches National Park area. What this
7 does is contrast these two stacks of rock. It also
8 indicates other things.

9 Let's go back to the stratigraphic column on the
10 right side of the figure. What this shows is, first of
11 all, that coming from the top down, that the surface
12 formation, which was depicted on the previous exhibit --
13 as busy as that was -- is the surface out there is the
14 lower-most part of the Mancos shale and right at the top
15 of the Dakota Formation. Then going down through that,
16 of course, the other formations I mentioned, the various
17 members of the Morrison Formation.

18 And then the way I set up this particular
19 comparison of these strat columns is the datum I used was
20 the base of the Summerville in this area, which is a
21 continuous formation across both.

22 Then below that, once I get below that
23 stratigraphic datum, then I show the position of the
24 Entrada Sandstone, which is labeled on the east section
25 here, "Low BTU Gas Zone" because that is what the BLM is

1 concerned with in their correlative rights in this
2 formation, the Entrada Sandstone, which is superjacent,
3 not only the proposed injection zone, but also the
4 identified confining zone for the injection zone.

5 Getting to that, the next formation down is the
6 Kayenta Formation. That's the confining zone identified
7 in this permit to confine all of the produced water that
8 is injected and intermixed with the in situ water in the
9 proposed injection zone in the Wingate Sandstone.

10 So we've got that layer, then the proposed
11 injection zone, the Wingate Sandstone. Below that, a
12 subjacent confining layer known as the Chinle, which is a
13 Triassic Formation. Below that, in the area of Harley
14 Dome, there is the granite basement. There is no other
15 sedimentary formations present because of the unique
16 stripping of those from the Uncompahgre Uplift.

17 Now, to contrast that, on the left side of the
18 diagram the stack is fairly similar. As you get down,
19 the Morrison is there within that area. The Summerville
20 is marked on it. The Entrada is there.

21 And then we see a couple of things that aren't
22 present at Harley Dome. There's the Carmel Formation and
23 the Navajo Formation. And the Navajo, of course, was of
24 concern to the residents of Grand County because that is
25 part of their aquifer system. The Navajo Sandstone does

1 occur and is part of the aquifer system in the Moab area.

2 And from that section on down, it's similar.

3 You see the Kayenta. And then the Wingate Sandstone is
4 down there. And then a lot of other older sedimentary
5 formations, which aren't present at Harley Dome.

6 The thing to take away from this, partly, is one
7 of the key elements of the aquifers that are developed
8 for potable water in the Spanish Valley area is the
9 Navajo Sandstone. The Navajo Formation, the whole entire
10 formation, and the superjacent Carmel are not present at
11 Harley Dome at all. So we don't have -- the proposed UIC
12 activity will not impact the Navajo Sandstone at all.
13 It's completely isolated laterally. So that was a key
14 issue here to depict, especially for the residents of
15 Grand County.

16 MR. CLAWSON: And this exhibit shows the upper
17 confining zone and the lower confining zone?

18 MR. ALLIN: Yes, that's right.

19 MR. CLAWSON: At the UIC location?

20 MR. ALLIN: It also indicates that the surface
21 formations in the Moab area start with the Navajo. So
22 the Entrada is not buried in the Moab area at all, and
23 it's air filled.

24 MR. CLAWSON: Now, let's move on to Exhibit
25 No. 9. Are you familiar with this exhibit and have you

1 examined it?

2 MR. ALLIN: Yes.

3 MR. CLAWSON: Can you please tell us what this
4 is and what it shows?

5 MR. ALLIN: This is a smaller scale map from
6 Exhibit -- was it 2, the previous geological map?

7 MR. CLAWSON: I think that would be Exhibit 5.

8 MR. ALLIN: Exhibit 5, I'm sorry.

9 This depicts similar information, but it's
10 scaled down to the point where a mile here is about, oh,
11 5/8 of an inch, or so. So this narrows in more
12 specifically on the square miles and the townships
13 immediately around the Harley Dome proposed injection
14 well.

15 It is labeled in about the middle of this map,
16 where it says "Harley Dome 1" and with a black dot just
17 to the left of Harley Dome 1. That is actually the
18 physical location of the well. There's also another
19 spot -- there's two other spots label on the map. One is
20 a well that was used -- that I used and relied upon
21 extensively in the original UIC permit, which was filed
22 last -- in 2009. And it is what I used for an offset
23 well to examine and try to predict water quality,
24 reservoir quality at the injection well site. And that
25 well is called the Lansdale Government 13. And so

1 there's some information from that well that indicates
2 that the -- where the elevation of the injection zone is.
3 And in that well, I believe it's -- 3637 is labeled for
4 JW, which stands for Wingate Sandstone. And in the
5 Harley Dome 1 well, which was drilled last year -- or
6 this year, earlier this year in May, just to gain
7 additional information on all of the geology here, verify
8 it at the injection well site. And this well was an
9 exploratory well to begin with, but planned to be used as
10 a conversion to injection if it qualified.

11 And so at the injection well site, once it was
12 drilled and logged, we were able to determine that the
13 top of the Wingate Sandstone had an elevation of about
14 3532.

15 Now the other spot that's labeled on this map,
16 and the surficial geological formations, is noted with a
17 little X down in the lower right quadrant of the map
18 along the Colorado River, which is -- I guess, "River" is
19 labeled, it doesn't say Colorado. But at any rate, that
20 is the Colorado River as it comes out of the Ruby Canyon
21 at the far east edge of the map and then exits down
22 through Westwater Canyon at the bottom center of the map.

23 But the nearest outcrop of the Wingate Sandstone
24 that's of concern, since it's the injection layer that's
25 proposed in this permit, the nearest spot is 5.8 miles to

1 the southeast of the proposed injection well site. And
2 there is an outcrop at the top of the Wingate Sandstone,
3 and it dips down into the river. And its elevation at
4 that point is about 4350. So it's about 800 feet higher
5 in elevation at the river level at its nearest outcrop
6 point from where it was intersected in the well that was
7 drilled to evaluate this project and develop the data
8 that was necessary to fulfill the requirements of the
9 permit and so that they could be adjudicated by the staff
10 here.

11 So the elements of this are that the river level
12 is in the 40 -- and the outcrop -- is about 4350 feet.
13 The level of the formation where it is proposed for
14 injection is 800 feet in elevation lower than that. So
15 there is a substantial elevation difference.

16 Also, the other thing to look at on this map,
17 the Wingate Sandstone. As you can see along the river at
18 the east margin of the map, there's a little designated,
19 and it's kind of a dark green color. It says "TRW,"
20 which stands for Triassic Wingate. And there's a band of
21 that rock on both sides of the river in Lower Ruby
22 Canyon. Above that, there's a turquoise-colored band
23 that's labeled "TRK," which is the Kayenta. That is the
24 proposed, or the confining, layer that confines the
25 Wingate aquifer.

1 Notice how, although the Kayenta in this area is
2 only about, somewhere over 100 feet thick, it covers a
3 large area on this map. It covers, oh, probably fully 25
4 percent of this area down here above the river on the
5 plunge of the Uncompahgre Uplift. The reason for that is
6 it's a very, very hard, dense, flagstone type formation.
7 Years of abuse by the Colorado River glaciers, the forces
8 of erosion, have done very little to erode much of the
9 Kayenta Formation off of the plunge of the Uplift.

10 You also see, even at this scale of this map,
11 any major faults would be labeled on it. There's a few
12 up here in some of the green areas by the freeway. But
13 on that Kayenta outcrop, you don't really see a lot of
14 marked black lines, which indicate faults and fractures,
15 and things. And that's because it's really a very dense
16 formation. It's very competent. It's got some clay
17 minerals in it, which -- the other attributes of the
18 formation I go into with another figure, and that has to
19 do with the modern logs that were run on the new well
20 that was drilled out there earlier this year. That's
21 really what this map is designed to show.

22 And also, there are red lines on here, which are
23 contour lines originally drawn to illustrate what the
24 structural surface of these formations is like at any one
25 level. They're originally drawn by the authors of the

1 map of the Dakota Sandstone and then projected where the
2 Dakota is absent in the southeastern, or the lower
3 right-hand corner of the map. They're projected down
4 350 meters above the Wingate. So basically, the contours
5 show you the relative shape of areas of equal elevation
6 of all of the formations. There's slight variations as
7 you go down through the stack. But in general, these
8 lines show areas of equal elevation.

9 So if you follow the nearest line, which is
10 actually labeled "1500" on this figure, from the upper
11 right-hand corner, follow that line down with your eye
12 over towards where "Harley Dome 1" is labeled. And that
13 bends around. It bends northward over a structural axis
14 that's labeled on this map, "Bitter Creek Anticline,"
15 flexes down downward, southward through the Bryson Wash
16 syncline, which is -- right on the access of that is
17 where the Harley Dome 1 was spotted and drilled.

18 And then it bends back northward around the
19 plunge of Harley Dome, where the little helium reserve is
20 located, which is confined to a very small area. It's
21 about 200 acres up there, with a very low pressure helium
22 reserve that's got about six percent methane in it, a
23 couple percentage points of helium, and the rest is
24 nitrogen.

25 But if you follow that around down through the

1 map, that contour line is basically going to indicate if
2 you inject, even almost unlimited amounts of injectate,
3 into the formations, it's going to be almost impossible
4 to raise the formation pressure of the Wingate Sandstone
5 significantly enough to ever back water across that line
6 anywhere southeast of that line.

7 And that's the key thing to take away from this
8 particular figure. It just reaffirms in a more focused
9 area what the configuration of the formations are, what
10 the relative elevation of them is, and what the relative
11 elevation is on outcrop between the river area and the
12 proposed well.

13 And here at this scale, you can see the extra
14 little wrinkles in it that are like the Harley Dome, the
15 Bryson Wash syncline, and the Bitter Creek anticline.
16 Those are little wrinkles you couldn't see on the other
17 map. But here, you can see that now -- and the way water
18 behaves in an injection situation here is it will move at
19 right angles to these contour lines. So what's going to
20 happen is water injected into this will gradually -- and
21 this is very gradually. This stuff moves at a couple of
22 feet over periods of years, depending upon the amount of
23 injection. But it would tend to move down the Bryson
24 Wash syncline or northerly from the injection site.

25 MR. CLAWSON: Could you just elaborate just a

1 little bit further on something you just stated in terms
2 of when you are looking at the contour line -- that would
3 be the 1500 contour line here -- it's nearly impossible
4 for the water -- that injected water to move to the
5 southeast? I mean, I'm paraphrasing but...

6 MR. ALLIN: Yes, that's right.

7 MR. CLAWSON: Could you explain that a little
8 bit further, why would it be impossible for the water to
9 move southeast?

10 MR. ALLIN: It has to do with the fact that the
11 Wingate Sandstone and the measurements that were made in
12 the well that was drilled last May, and the measurements
13 that were made since that time during the process of
14 completing it and testing it. And what we found there is
15 that once we got the zone open so we could production
16 test it by perforating the casing unit and isolate it
17 only within the Wingate Sandstone -- because one of the
18 requirements of the UIC permit is that the permittee
19 provide accurate information and characterize the connate
20 water, or the water resident within the proposed
21 injection zone.

22 So once that was done, then we had to go back
23 and we were required to do -- or the client was required
24 to do some remedial work on its casing cement. At that
25 point, additional perforations had to be made further up

1 in the well in order to introduce more cement behind
2 casing and straighten up the one little aspect that had
3 to be fixed.

4 During that operation, we managed to get with a
5 contractor that's running wire line equipment down into
6 the well. We were able to establish an accurate level of
7 the static fluid level within the well by running the
8 tools in and determining how far from the surface it was.

9 During those runs, on June 28, earlier this
10 year, we found that the static fluid level in the Wingate
11 was about 600 feet. This means that it's substantially
12 subnormally pressured. The normal pressure, even on
13 fresh water in the formation, would be -- the water
14 column, it would be almost full -- would indicate that at
15 that depth you would have probably about six or
16 700 pounds per square inch formation pressure.

17 What we found, knowing the elevation of that
18 being down 600 feet from the surface, is the formation
19 pressure at the top perforation that had been made
20 earlier in the month was about 327 pounds per square
21 inch.

22 What I found in my experience in evaluating
23 hydrodynamic reservoirs for production of oil and gas is
24 that very commonly they have these attributes in common.
25 They are subnormally pressured, drastically subnormally

1 pressured. What that indicates is that water is moving
2 there. It may not be moving quickly, but it's in a
3 process of moving. There's a constant drain of water.
4 You add water to it, you are not going to increase that
5 formation pressure significantly. And I'm talking about
6 thousands of barrels a day with the height of the porous
7 formation beneath it, which we've got 337 feet of gross
8 formation, 552 perforations in it, significant porosity
9 that I'll get into later. But it's above 20 percent.
10 The water diffuses into that at such a rate that it will
11 not back up pressure that will initiate crossing contour
12 lines, for instance. It's going to disseminate
13 laterally, and especially favor anything downdip. It's
14 going to try to go lower in elevation or laterally. It's
15 certainly not going to go uphill.

16 MR. JENSEN: Having said that, what's the
17 impact, then, or where does the 6500 barrels maximum per
18 day -- does that have something to do with what you've
19 analyzed, then, and what capacity this has to take and
20 absorb?

21 MR. ALLIN: Yes. And it has to do with -- and
22 there's a figure on that in here, too, or an exhibit. It
23 has to do with testing that was done on the well with a
24 large pump and significant amounts of fluid. And it's
25 called a step-rate injection test. It's a requirement of

1 the permit that we establish what a frac gradient in the
2 proposed injection zone is. That is done by having
3 enough fluid on hand -- and in this case fresh water,
4 because we had to know the precise density of that water
5 in order to get an accurate read on it.

6 But it's pumped into the well at increasingly
7 faster rates. But they are held for ten to 15 minutes at
8 each plateaued rate until you get a break point, which
9 indicates the creation of a fracture by the pumping
10 operation. At that point, you can determine a frac
11 gradient. You can also determine what the maximum
12 allowable injection pressure, MAIP, is going to be. And
13 that is done by rule, and the Division sets that. It's
14 based upon this test.

15 And so from that point on, even though, in all
16 deference to Mr. Shea and his question of whether or not
17 I'll be around once the well is in operation, I will
18 probably not be involved in day-to-day operations of it.
19 But I know that by rule, and if the operation of the
20 facility is in compliance, the injection pressure
21 established by that test will never be exceeded. And so
22 under those circumstances, it's a known fact that if no
23 fracture is being induced, it's not going to go out of
24 zone.

25 There's also one little point in addition to

1 this, is that although we didn't test it and induce a
2 fracture into the overlying confining zone -- which is
3 kind of something you want to avoid, anyway, in the area
4 of an injection well. But if I had a point where I could
5 determine a frac gradient in the Kayenta Formation
6 outside of the area of this injection well, it would
7 probably be substantially higher than what's within the
8 porous injection zone, just because of the mechanical
9 properties of the confining zone being substantially more
10 robust than this porous injection zone.

11 And so as long as the well is operated within
12 the rules, there really isn't a chance that you are going
13 to start backing water across this key contour line on
14 this diagram, which here it's labeled "1500." But that's
15 what eliminates a possibility of moving water updip. It
16 would take -- you'd have to be operating the facility
17 well out of its design, or its, even, ruled parameters.

18 MR. JENSEN: So help me to understand -- and I
19 apologize -- but the 6500 that you came up with, that's
20 the result. But on a day-to-day operation, are they
21 going to simply be measuring at 6500, the top part of
22 their watching pressure, and if they hit the pressure,
23 irrespective of gallons, that's it?

24 MR. ALLIN: You are exactly right. And that's
25 how the MAIP is set, and you cannot exceed that. And

1 what -- and I didn't answer your question. I'm sorry
2 about that.

3 The step-rate injection test also, at the point
4 where the fracture was induced, was at about, I think --
5 we'll get to that figure -- but it was about 4 1/2 or
6 5 barrels per minute. So if the rules typically say
7 that, you know, the MAIP operational limit is going to
8 be, oh, 15 to 20 percent of that number -- say it's three
9 hundred and, whatever, sixty PSI, or something, then
10 that's going to be about 3 1/2 barrels a minute. So if I
11 just multiply that out by 440 minutes in a day, then I'll
12 come up with somewhere around 6000 barrels. That's where
13 it comes from. It's a figure that's not set in stone, by
14 any means. It's not even regulated. The only thing
15 that's regulated is the surface pumping pressure to avoid
16 inducing fractures. And so wherever that falls out, that
17 rate -- disposal rate, it's not a governed number.

18 MR. JENSEN: Thank you.

19 MR. CLAWSON: Thank you. Let's move on to
20 Exhibit No. 10. Are you familiar with this exhibit?

21 MR. ALLIN: Yes.

22 MR. CLAWSON: Can you please tell us what it is?

23 MR. ALLIN: What this is, is a four-page
24 exhibit. And what it is, is an annotated picture of the
25 downhole/open hole well log that was recorded by

1 Halliburton in the well on May 22. This is when the well
2 is open hole.

3 I've also annotated it with some information
4 about the formation tops. You see very detailed
5 information on various formation tops that are similar to
6 what was on the schematic diagram of the stratigraphic
7 column. The elements that were on that stratigraphic
8 column were verified by the drilling of this well. And
9 the various curves on this long chart, basically, enable
10 experts to be able to determine various aspects of the
11 quality of the rock that's being measured by these
12 curves.

13 I've also annotated where the water samples,
14 that are also exhibits that were submitted, were taken,
15 either during drilling or post drilling. And those are
16 annotated at the points where they were set on the --
17 where they were depth-wise, and then the information on
18 what the quality was.

19 So on the first page of this Exhibit 10-1,
20 starting at around -- the top of the figure, I think,
21 starts at a log depth of around 800 feet, or so. The
22 first formation cross is a lower member of the Morrison.
23 Then there's a Summerville Formation. These are on the
24 strat column.

25 Then the first porous formation that shows up is

1 the Entrada Sandstone here, thrown in with the Moab Mbr
2 of Curtis -- but at any rate, what everybody would call
3 the top of the Entrada Sandstone. This is the same
4 formation that nearby on the Harley Dome structure
5 itself, the BLM is concerned about their little helium
6 reserve over there.

7 And so what this shows is the curves kind of
8 have a predictable behavior. The far right track is a
9 natural gamma ray curve. The further to the right that
10 curve goes, the cleaner, or less shaley, the formation
11 is, the more porous it's liable to be. So sandstones,
12 like the Entrada, have a signature with a curve far to
13 the left of the tracks there.

14 The middle set, which are the log rhythmic
15 curve, are resistivity measurements. And in shaley
16 formations, they're typically a little more resistive,
17 push the curves to the right. The sandy formations,
18 especially if they are full of brine water, have very,
19 very low resistivity -- here measuring in just a couple
20 of ohms, which is extremely low.

21 So as you cross the line into the, depth-wise,
22 down the center column for instance, the depth of the top
23 of the Entrada at 885, you see the resistivity curves
24 just collapse to the left. The curves in the right-hand
25 column, there's a red curve, which is a neutron porosity

1 curve, and a black curve, which is a density porosity
2 curve.

3 In porous formations, if these curves are set up
4 and calibrated correctly, they will track almost right
5 over each other. Unless gas is present, natural gas were
6 present, they would cross over. That red line would
7 cross over the black line to the right.

8 Here we see them tracking. We don't see them
9 tracking above in the Tidwell or the Summerville, and
10 that's because they involve a lot of clay content. You
11 see the gamma ray move over to the right. And that is
12 more radioactive, indicative of shaley rock, which is
13 mainly -- is developed in -- it's impermeable rock, in
14 general. And what it does to the neutron density curve
15 is the neutron curve gets pushed to the left and starts
16 separating from the density curve. And the way you would
17 read the average porosity in there is to average between
18 them.

19 But as soon as you get on top of the Entrada,
20 they track each other. You see fairly high porosity.
21 The porosity units are from minus ten to plus 30. So
22 it's 20 percent porous, and there 15 to 20.

23 And down through that -- now the only other
24 thing to point out about the first page of this is there
25 was a water sample taken right about after the second day

1 of drilling into the top of the Entrada. We'd just
2 stopped at the top. The water filled up overnight, which
3 included everything above it: Sandstones and the
4 Morrison, the -- I think we had some of the -- Morrison
5 was exposed, and so any porous elements in that. So
6 anything below surface casing was exposed. This was
7 below 225 feet at the site. The quality of that water,
8 on a mixed basis, was over 30,000 parts per million total
9 dissolved solids. This is water within 220 feet of the
10 surface down to about 850. That was an overnight fill.
11 We got a sample of it. There wasn't a lot of water,
12 either. Nothing there qualifies for a significant,
13 usable water, water supply, because it doesn't yield much
14 water. Also, with that salinity, it doesn't qualify as a
15 USDW. In fact, due to the lack of water in the Dakota,
16 which periodically in a few spots -- remote spots -- out
17 in the Greater Cisco field, there are some instances of
18 fresh water in the Dakota at very shallow depths. At
19 Harley Dome, they weren't fortunate enough to find any.
20 I mean, there's really no USDWs in any formation that was
21 drilled in this well.

22 To progress down -- the only thing to say on
23 water quality again, there was a water sample taken while
24 the well was drilling at about a thousand feet, and
25 that's marked on this first page of this exhibit. And

1 the water quality there during drilling, which then it's
2 starting to entrain some Entrada water, it's 36,000 parts
3 per million. So again, much more saline than the cutoff
4 that would be necessary to preclude it from being used as
5 an injection zone, which is a 10,000 parts per million
6 TDS.

7 Now, to go to the next page. We finally get
8 to -- let's see. About 1143, I have marked the top of
9 the Kayenta Formation. This is now the base of the
10 Entrada. You start seeing some changes in the behavior
11 of the curves here. And the Kayenta Formation is the
12 confining zone, or the Wingate.

13 Within these curves, you can see a couple of
14 things happen. The gamma ray curve in the left track
15 gets much more jagged than where it was through the
16 Entrada Formation. It's showing more radioactive clay
17 minerals, and the resistivities start to go up, showing
18 it's lack of porosity, more resistive. And then the
19 neutron density curves, the red and black curves in the
20 right track, they start to separate again. They are
21 separating because there's a lot of clay mineral in this
22 formation again. Unlike the Entrada, which is a
23 fossilized sand dune, which is almost pure sand, the
24 Kayenta has a significant amount of sand, but also has a
25 significant amount of clay that was deposited in braided

1 stream channels. And it's woven together into this very
2 hard overall rock, which makes great flagstone, dimension
3 stone. In fact, the Park Service frequently uses it for
4 building visitors' centers, and did around -- during the
5 30s, CCC/WPA crews -- but, I digress.

6 So what this confining layer measurements from
7 these new logs show is that if I accumulate the amount of
8 rock that has virtually no porosity in it -- and I just
9 accumulated what has less than two percent density
10 porosity, which -- that's a type of rock where you're
11 never going to get any fluid out of it, you're not going
12 to be able to pump fluid through it or into it unless you
13 fracture it artificially, and there's 36 net feet of that
14 very type rock within this 130-foot zone, or so, that's
15 the confining layer that we're using as the confining
16 layer for the injection zone.

17 At the very bottom of the figure, I show the top
18 of the Wingate formation at a depth of 1342. Here
19 there's another fairly abrupt change in the behavior of
20 these curves. The gamma ray curve moves to the left. It
21 cleans up. It's sandy. The resistivity is collapsed
22 back into a couple of ohms. The density and neutron
23 porosity curves jump right over into the 22 percent range
24 and start tracking again.

25 There's notations here on water samples again,

1 overnight fill, which included mainly water from
2 everything open in the well down to 1330 feet -- or just
3 before the Wingate was opened, it had a gross water
4 quality of 35,000 ppm. And that's combined, everything
5 from the surface casing down to that point. So very
6 similar to that other overnight fill water quality
7 sample.

8 Below that, there's a notation that after the
9 well was perforated and production tested on June 11,
10 that the water quality from a sample there -- there was
11 still a mix of lost completion fluids, but it tested at
12 34,000 parts per million. So these are very briny
13 formation fluids that occupy all the porosity in this
14 well. I mean, it's triple what the levels are that would
15 qualify it as a USDW, even by rule. And the water
16 quality that would actually be used under potable -- for
17 potable uses, unless a very complex system like
18 Mr. Stewart proposes is used to treat it, you really need
19 to be looking at water that's under 3000 parts per
20 million if it's going to be used.

21 Now, the other thing that this shows as we go to
22 the 10-3, in the depth column there's a number of heavy
23 black lines. These are the perforated intervals that
24 were made in the injection zone in order to set it up for
25 testing. And ultimately, they will be the zones that

1 will be open for injection if the permit is granted. So
2 there's, I think, over 337 gross feet. There's 552 holes
3 over about 130 net feet. And that's what those show.

4 Now, the other things to at least read from this
5 presentation, to quickly summarize, is that within the
6 Wingate under the gross 337 feet, there was 43 feet of
7 rock with a density porosity greater than 20 percent.
8 This is fabulous reservoir rock. I'd love to see this
9 stuff in a -- full of hydrocarbons someplace.

10 And then the next category had a cutoff of 16
11 density porosity, and there's 48 net feet of that.

12 Then there's another 130 feet of rock in this
13 well in this injection zone that's greater than
14 ten percent porosity. All of that qualifies as reservoir
15 rock. And it's 220 total feet.

16 Now, the last page of the exhibit shows the top
17 of the Chinle Formation, which is the lower confining
18 zone. This is what isolates the Wingate Sandstone from
19 the more brittle subjacent basement rock, the granite
20 that's exposed in Westwater Canyon, for instance. And
21 this well was not -- I was supervising drilling this
22 well, and I just wanted to cut about half of it. I
23 didn't even want to drill all the way through it in order
24 so that I could see the base of it on logs. But I cut
25 about 50 feet of it and got it logged. And what this

1 shows is all 50 feet had zero percent density porosity.
2 It's a very shaley formation.

3 And while drilling near the base of that -- so
4 I'm mainly getting Wingate water, although there is some
5 water coming in from uphole. When the Wingate was
6 drilled, the well -- because we were drilling with air,
7 so it's basically under balanced -- so whatever fluid was
8 in the formation, whatever the connate water was, it gets
9 produced as the well was drilled. So it's easy to get
10 water samples that are clear.

11 The water, as the Kayenta was drilled through,
12 the well was making, maybe, a couple of barrels an hour,
13 two or three barrels an hour. That rose 30 barrels an
14 hour once the Kayenta was penetrated completely and the
15 top of the Wingate Sandstone was opened. And then a
16 sample of that that was taken and analyzed, that's the
17 one where we get over 50,000 parts per million total
18 dissolved solids in that. So it's a very briny water,
19 especially for this depth. And so it's been -- it's
20 something that would have been an old connate water.

21 And so from the standpoint of everything that
22 was put together to drill the well, gather the water
23 samples, evaluate it with modern logs, it indicated --
24 the most important thing to take away is there are no
25 USDWs at this site, and that the Wingate will make a good

1 injection zone, the confining layers are competent. And
2 basically, this figure would prove that to almost any
3 expert. And I think the Division staff would agree. I
4 can't speak for them. And that's really what the basis
5 of all that information is.

6 And it's very expensive to get this information.
7 A well had to be permitted, drilled, cased, tested. All
8 of this has to come together to provide enough
9 information to make an intelligent decision as to whether
10 or not this area qualifies as a site for injection well.

11 MR. JENSEN: And this 30 barrels that you
12 finally ended up with per hour that you were estimating a
13 brine water, that's coming out of the Wingate?

14 MR. ALLIN: That's coming right out of the
15 formation.

16 MR. QUIGLEY: Which formation?

17 MR. ALLIN: Out of the Wingate Sandstone. And
18 it was similar to the water we got on production testing
19 post perfining. It was just that that was a mix of lost
20 fresh water from displacing cement. And so -- and even
21 on drilling, there's a little bit of water lost. But
22 that's the reason why the production testing, had we kept
23 the rig out there and tested another three or four days,
24 those samples should have come up almost identical.
25 Rather than 35/55, they both should have been around 55.

1 MR. HAROUNY: So you don't think the Wingate,
2 the pore space in Wingate, is already occupied by salt
3 water?

4 MR. ALLIN: Yes. It's completely occupied by
5 salt water, and there were no hydrocarbon shows in it
6 whatsoever, and none logged.

7 MR. HAROUNY: So where are you going to inject
8 more water into occupied space?

9 MR. ALLIN: Well, one thing about it is we know
10 from the fluid level that the formation pressure is only
11 327 pounds at 1344 feet below the surface. So that means
12 that it basically will imbibe any fluid that's added to
13 it that creates a column of water higher than 600 feet.
14 And it will continue to seek that level. It's just like
15 adding stream water to a reservoir with a spillway
16 elevation, say, of 1000 feet. You've got a line all the
17 way around the reservoir at 1000 feet, and you keep
18 adding water to it and it just spills over the spillway.

19 In this case, there's a bathtub drain that's
20 leaking. And that's really what the low pressure in the
21 formation indicates to me and the way it will behave with
22 all that porosity.

23 MR. HAROUNY: So as far as hydrodynamics, it's
24 going to move north and northeast -- northwest?

25 MR. ALLIN: That's my conclusion, and not from

1 this data, but from a study I did of the superjacent
2 aquifer in the Entrada, where we have more penetrations
3 deeper in the Basin. So I could put together a more
4 complete map of where the lower pressure regimes are.
5 And they stagger right down northward.

6 And so there's two elements. There's a pressure
7 gradient that decreases northward within the confined
8 aquifers, and there's also the physical tilt of the
9 formations. And we know at the outcrop level that
10 there's just air.

11 MR. JENSEN: Following up on Mr. Harouny's
12 question, though. This additional -- this ability to
13 take this additional water is still confined to the
14 Wingate?

15 MR. ALLIN: Well, I mean, the water could be
16 infused into other formations there, too, but just at a
17 much slower rate. They don't have -- the logging proved
18 that the best injection zone, just from the quality of
19 the rock, is the Wingate Sandstone. I'm not sure if
20 that's the answer you are looking for, though.

21 MR. CLAWSON: The water will only be injected
22 into the Wingate. That's where the perforations are.

23 MR. JENSEN: And your point being that you've
24 got the -- I can't remember -- the Chinle below and the
25 Kayenta above?

1 MR. ALLIN: Kayenta above, right.

2 And those are the isolating layers. The well
3 has to be operated with a packer in the hole, which
4 ensures that the injectate enters below the top of the
5 confining layer in the wellbore and then can only go into
6 the perforations that were made in the casing.

7 MR. HAROUNY: How close is this to any Entrada
8 production, actual Entrada production?

9 MR. ALLIN: The nearest Entrada production is in
10 Santa Royal, which is about six miles north, where it
11 produces both oil and gas -- well, mainly low BTU gas.
12 And then 20 miles to the west at Cisco Dome, it produces
13 oil.

14 CHAIRMAN JOHNSON: Mr. Gill.

15 MR. GILL: What's the range of the TDS of the
16 water that's going to be injected?

17 MR. ALLIN: Well, this is a little different
18 than a lot of UIC permits you see, where it's a single
19 field and the water is, you know, pretty predictable
20 from, like, say, two dozen wells, or something. Since
21 this is a commercial facility, they can pick up water
22 from a variety of fields. And just the ranges that I've
23 seen that I had to research for the permit of Utah water
24 and Colorado water, there's a range from 15,000 ppm water
25 to 150,000 to 200,000 ppm water, especially over at the

1 Green River area, where there is very, very heavy brines
2 at Green River, Utah. Then there's lighter brines in
3 general that are coming from the gas wells in Piceance
4 Basin in Colorado.

5 CHAIRMAN JOHNSON: Mr. Clawson.

6 MR. CLAWSON: Just for clarification, you used
7 the term "connate water." Can you please tell the Board
8 what that means?

9 MR. ALLIN: "Connate water" is fluid that
10 occupies the pore space in the rock that you assume it's
11 native, or in situ, to the rock in its current condition.

12 MR. CLAWSON: Just so you know.

13 Okay. Are you aware of any geologic structures
14 near the injection well that would allow the injected
15 fluids to migrate to an underground source of drinking
16 water?

17 MR. ALLIN: No.

18 MR. CLAWSON: Has the casing in the Harley Dome
19 No. 1 well been tested?

20 MR. ALLIN: Yes.

21 MR. CLAWSON: Can you tell us how?

22 MR. ALLIN: Pressure tests were done on it
23 before drilling -- before perforations were made in it,
24 after the long string cement was first emplaced on it.

25 And then after the perforations were made and as

1 part of the operations and step-rate testing, there was a
2 second test made with the same pumps that were used for
3 the step-rate testing. And it's another required test by
4 rule. It's called an Internal Mechanical Integrity Test,
5 or an IMI. So the pumps were used to hold 1000 pounds of
6 pressure on the formation, which is probably going to be
7 almost triple any operating pressures. And that was done
8 and verified by a third-party contractor in a report
9 that's an exhibit that's deeper in the pile.

10 MR. HAROUNY: How much of surface casing do you
11 have in this well?

12 MR. ALLIN: Surface casing set here is about 224
13 feet.

14 MR. HAROUNY: Is that enough to cover all the
15 potential aquifers and surface water zones adequately?

16 MR. ALLIN: That was designed, although I
17 didn't -- even when the surface hole was being drilled --
18 because I was there for all of the operations -- there
19 were no indications of any fresh water in the Dakota,
20 which we drilled into at about ten feet. But that
21 surface string was designed to be set through and
22 cemented back to the surface to isolate everything from
23 the top of the Morrison. So that particular casing
24 string isolates the Cedar Mountain and Dakota completely,
25 although there's no evidence that there's any fresh water

1 in those formations out there.

2 But if there were, and because there are known
3 areas within 15 or 20 miles where there are some
4 anomalous fresh water and very shallow Dakota wells,
5 that's the reason it's isolated.

6 MR. HAROUNY: And your second attempt of
7 re-introducing cement brings the cement up to this
8 surface casing -- your production casing, or long string
9 ties it up to the surface casing?

10 MR. ALLIN: Yes, that's right. The squeeze that
11 was done on it brought the cement top from around the top
12 of the Entrada, crossing over the surface casing string.
13 I think the cement topping is about 100 feet. So there's
14 overlap of 120 feet, or so.

15 MR. HAROUNY: Okay.

16 MR. CLAWSON: You indicated that Exhibit 10
17 shows the zones where the well has been perforated.

18 Are the injection intervals below any safe
19 drinking water aquifer?

20 MR. ALLIN: Yes.

21 MR. CLAWSON: Just to kind of cover it again,
22 what will be the average rate of injection for the water?

23 MR. ALLIN: The average rate is going to be
24 governed by the maximum allowable injection pressure.
25 And just from looking at the results of the step-rate

1 injection testing, that's going to be a rate of 3 1/2
2 barrels a minute, or so.

3 MR. CLAWSON: And under what pressures?

4 MR. ALLIN: The pressures will be limited
5 because of where know we can induce a fracture in the
6 injection zone rock. And it should be around 360 or
7 sixty-five pounds, would be an operating pressure that
8 the well will be limited to.

9 MR. CLAWSON: Now, I'd refer you to Exhibits
10 No. 12 and 13. Are you familiar with these exhibits?

11 MR. ALLIN: Yes.

12 MR. CLAWSON: Would you please tell us what they
13 are?

14 MR. ALLIN: Exhibit 12 is the report from BJ
15 Services, which was the contractor used to perform
16 step-rate injection testing and internal mechanical
17 integrity testing of the well. And this is a requirement
18 of the rules that it has to be configured, as it will be
19 for injection, with a tubing string in place, a packer,
20 and the injection zones all set up. And so the well is
21 configured the way it will be -- it was at this date.
22 And this is back in July, I think. Yeah, July 17 -- or I
23 made notes on it on the 17th.

24 What this shows, the first page just is a report
25 of rates of pumping. I've made some notes on it. They

1 also established the frac gradient, which is stated.

2 Then the second page of the exhibit is a chart
3 of the pumping rate. What it does, it takes all of the
4 numbers from the spreadsheet on the first page and put
5 them in a graphical form. This is a real graph that's
6 produced by transducers on the tubing string and on the
7 contractors' pump as they're pumping.

8 And what you see here is time along the lower
9 axis, and pressure on the Y axis. And then rates are
10 noted as the pump is brought from a barrel per minute to
11 a barrel-and-a-half per minute, two barrels, on up,
12 stepping bigger and bigger steps. But each step held
13 even at a pump rate. And then pressure is measured at
14 those pump rates.

15 And what this tended to show is: You can see,
16 as they got to about seven barrels per minute and a
17 pressure built at a little over 400 pounds, that there's
18 a spike in the pressure reading. It spiked up to 425,
19 then dropped back to 400 and started building again as
20 they were pumping at seven barrels a minute. Then
21 there's various steps above that at nine barrels a minute
22 and 11 barrels per minute.

23 Once that's analyzed, you can -- well, I should
24 say one other thing: Then they stop pumping, and so we
25 know we've induced a fracture there because of that break

1 point at 400 psi. And so then when they stop pumping,
2 there's a point at which any induced fracture is known to
3 close. And that's called a shutdown pressure. And that
4 was at 250 psi. Those are two key pressures to notice
5 from any one of these pumping tests.

6 Then those are graphed out on the third page of
7 that exhibit. And they're looking at the trends of the
8 rate versus pressure. And once a break point or a
9 fracture is induced in the formation, what happens is, as
10 the rate of pumping increases, the pressure doesn't
11 increase along with it in locked step. And that means a
12 fracture is being created and fluid is running out ahead
13 through the porosity of the rock faster than what it can
14 normally take it without breaking.

15 And so what this chart shows is at basically
16 almost six barrels a minute, there is a breakover point
17 in the behavior of the curves at 400 psi. So that, we
18 know, indicates a top perforation depth of about
19 1344 feet, knowing -- whatever the formation pressure is
20 there -- that when you add whatever column of fluid it is
21 in the well, the surface pressure cannot exceed 400, or
22 we'll reasonably assume to be fracturing the target
23 formation through the perfs.

24 MR. CLAWSON: Would you please just briefly
25 address Exhibit 13? What is this exhibit?

1 MR. ALLIN: Exhibit 13 is a report that was
2 submitted by a petroleum engineer from Colorado named
3 David Dillon. He was engaged by a party that was
4 considering an investment in the project and wanted it
5 evaluated by a third party. And Mr. Dillon, who I think
6 is formerly a Colorado state petroleum engineer at one
7 point in his career, just went through the general rules
8 that he knows of from UIC regulations, from the
9 permitting type regulations; evaluated the report, for
10 instance, that we just saw of the step-rate injection
11 testing, also just the configuration of the well; he
12 examined the logs; he created a little diagram on the
13 fourth page of his report of the configuration of the
14 well, the way it's set up, and the way it was tested.
15 And his general conclusions are a very good, short
16 synopsis that the Board can use to kind of familiarize
17 themselves with the attributes of this well and how it
18 should qualify for conversion to injection. And this is
19 a letter that just synthesizes all of those attributes.

20 MR. CLAWSON: So the general purpose of
21 submitting Exhibit No. 13 is just simply to give the
22 Board a narrative explanation on the UIC, the Harley Dome
23 No. 1 well, and the injection project?

24 MR. ALLIN: Yes, that's right. I think it's
25 simpler than going through the entire file the Division

1 has.

2 MR. CLAWSON: Will the Wingate Sandstone handle
3 the proposed injection pressures without causing
4 fractures?

5 MR. ALLIN: Yes. There will be -- the Division
6 will make -- the staff will make a determination, based
7 upon the step-rate injection testing, of what the maximum
8 allowable injection pressure will be as part of the
9 process of issuing the permit. As long as that limit,
10 which will be under 400 psi surface operating pressure,
11 as long as that is not exceeded, there will be no
12 possibility of inducing fractures, which may allow fluid
13 to migrate out of the proposed injection zone.

14 MR. CLAWSON: Is the Wingate Sandstone competent
15 to contain the injected fluids and prevent migration to
16 any underground source of drinking water?

17 MR. ALLIN: Yes, it is, in combination with the
18 confining layers below and above it, yes.

19 MR. CLAWSON: Do you expect that the formation
20 will remain competent under the injection operations?

21 MR. ALLIN: Yes.

22 MR. CLAWSON: Will the proposed injection
23 operations initiate fractures in the overlying rocks that
24 will allow the injected fluids, or even the formation
25 fluids, to enter a fresh-water aquifer and an underground

1 source of drinking water?

2 MR. ALLIN: No, that will be impossible.

3 And from the standpoint of the way the well is
4 configured where the perforations are, where the
5 confining layers are, and the operational requirements of
6 where the packer is set, that will eliminate any
7 possibility of mixing these waters.

8 There's just one other item I wanted to bring up
9 about water quality. The brine in the proposed injection
10 zone in the Wingate of 55,000 ppm also has unique
11 chemistry from the superjacent Entrada Formation, which
12 had about a 35,000 ppm brine. Those brines are
13 chemically distinct. And so in their natural state, it
14 proves that the Kayenta confining layer that intervenes
15 between those two porous formations is competent because
16 that water is never mixed.

17 MR. CLAWSON: Are there any wells within a
18 half-mile radius of the Harley Dome No. 1 well that could
19 provide a conduit that would allow fluids to migrate up
20 or down a wellbore and enter improper intervals, such as
21 a fresh water aquifer?

22 MR. ALLIN: No. There are two wells, but they
23 were not drilled deeply enough to intersect the proposed
24 injection zone. And those wells are also plugged
25 properly.

1 MR. CLAWSON: Is Wingate Sandstone an
2 underground source of drinking water?

3 MR. ALLIN: No, it is not.

4 MR. CLAWSON: Are there any domestic water wells
5 within the area of the Harley Dome No. 1 water well?

6 MR. ALLIN: My scan included the Townships 18
7 South 24 and 24 East, and 19 South 24 and 25 East.
8 There's no water wells of any kind in those townships.

9 MR. CLAWSON: In your opinion as an expert, will
10 there be any communication of the injected fluids with
11 potential sources of underground drinking water in
12 aquifers above the Wingate Sandstone due to the proposed
13 injection program?

14 MR. ALLIN: No.

15 MR. CLAWSON: Will there be any communication
16 with any surface sources of drinking water, such as the
17 Colorado River?

18 MR. ALLIN: No.

19 MR. CLAWSON: How can you be certain in either
20 case?

21 MR. ALLIN: The way the well is configured, the
22 regional geology formation pressures. There's a number
23 of elements that, all combined, convince me that it will
24 be impossible to do either one of the two items, either
25 pollute USDWs or surface drinking water supplies.

1 MR. CLAWSON: In your opinion, is there any
2 chance of contamination of a drinking water source that
3 could be caused by the injection -- proposed injection
4 operations?

5 MR. ALLIN: No.

6 MR. CLAWSON: Okay. Now I'd like to address the
7 letter that was dated December 7 that was filed by Living
8 Rivers earlier today very briefly. In that regard,
9 however, I'd like you to refer to Rebuttal Exhibits No. 2
10 and No. 3, which are part of the package that we
11 submitted earlier today. You may want to refer to those
12 in answering these additional questions.

13 Referring to the second full paragraph on page 1
14 of the December 7 letter, Living Rivers asserts that
15 "Westwater has entered an existing well."

16 Was the Harley Dome well drilled specifically
17 for purposes of this project?

18 MR. ALLIN: Yes, it was.

19 MR. CLAWSON: Was it an existing well?

20 MR. ALLIN: No, it was not.

21 MR. CLAWSON: On the second paragraph beginning
22 on -- or the third paragraph beginning on page 1 of the
23 letter, Living Rivers makes certain factual assertions
24 about the Entrada Sandstone.

25 Is Westwater going to inject water into the

1 Entrada Sandstone?

2 MR. ALLIN: No, it will not. It's not proposed.

3 MR. CLAWSON: So the Entrada Sandstone is not
4 the subject reservoir?

5 MR. ALLIN: No, it is not.

6 MR. CLAWSON: On the first full paragraph on
7 page No. 2, Living Rivers makes assertions about a
8 pressure head that may propagate toward the River Canyon.
9 You've already briefly discussed this.

10 But would you please explain to the Board why
11 you do not think that the water that's injected into the
12 Harley Dome No. 1 well will ever reach the Colorado
13 River?

14 MR. ALLIN: It has to do with two elements.
15 There's vertical separation, and there's lateral
16 separation. The lateral separation, of course, is
17 5.8 miles; the vertical separation is 800 feet. Even
18 taking into account a static fluid level in the well,
19 there is still not going to be a way to build formation
20 pressure in a zone with this high level of
21 transmissivity, permeability, and porosity.

22 In order to begin to build enough pressure, I'm
23 not sure I could imagine enough volume of water or
24 pumping rates that would allow building pressure in a
25 highly subnormally pressured reservoir like the Wingate

1 brine aquifer at Harley Dome.

2 MR. CLAWSON: Now I'd refer you to the item
3 Labeled G, which on the third page of the letter. Living
4 Rivers -- in the last paragraph on page 3, Living Rivers
5 is referring to a pressurized aquifer.

6 Will the injection operation -- injection
7 operations in the Harley Dome well create a pressurized
8 aquifer?

9 MR. ALLIN: Will it what?

10 MR. CLAWSON: Create a pressurized -- well first
11 of all, do you understand what a "pressurized aquifer"
12 might be?

13 MR. ALLIN: Not exactly. In essence, my
14 previous point was: We know what the formation pressure
15 is in the Wingate Sandstone. I'm just not sure how it's
16 going to be possible to materially increase that pressure
17 and build a wall of water uphill in a tilted formation.

18 MR. CLAWSON: I'd like you to refer to rebuttal
19 Exhibit, I guess it would be No. 3. Are you familiar
20 with this exhibit?

21 MR. ALLIN: Yes.

22 MR. CLAWSON: Could you please explain to the
23 Board the cross section at the top of that exhibit.

24 MR. ALLIN: The cross section at the top of the
25 exhibit, which is illustrated in the lower part of the

1 figure, which is another geological map at a scale of
2 about a quarter inch to the mile, it provides similar
3 information as previous exhibits on a slightly different
4 scale. It shows a little more of the Colorado River. It
5 shows more of the outcrop belt as the formations wrap
6 around the northwesterly plunge of the Uncompahgre
7 Uplift.

8 But taking a published cross section, which is
9 on an analogous trend to where the two areas in
10 question -- with Living Rivers and their concern about
11 the Westwater Canyon area stretch of the river and the
12 Harley Dome injection well site, this profile, although
13 it actually is drawn through lower Westwater -- the
14 middle of Westwater Canyon, the same type of thing
15 applies to the relative spot between Westwater Ranger
16 Station and the Harley Dome site.

17 So what this shows is the general tilt of the
18 formations on an even scale one-to-one. And the fact
19 that the top of the formation in the HD-1 well, where
20 it's labeled in the upper right on the A-to-A prime cross
21 section, it says "HD-1 Relative Position." Then it shows
22 two dotted lines that are horizontal lines, two dashed
23 lines. The lower one is drawn from the intersection of
24 the wellbore and the top of the Wingate Formation, which
25 is painted on here in kind of a light blue color on this

1 cross section.

2 The top of that injection zone, a horizontal
3 line is drawn under the area of the river. It comes out
4 to be 800 feet below the river surface, and of course,
5 laterally adjacent to all of the granite that's
6 underneath there. The upper part of the Wingate
7 Sandstone, of course, is on outcrop near and above the
8 river where it's filled with air.

9 Basically, that's the other thing this shows, is
10 the upper line shows that within the Wingate, since we
11 know that the static fluid level is about 600 feet from
12 surface, if that's projected over towards near the river,
13 that there are several miles of Wingate Formation over
14 there that have to be filled with air. Because if the
15 static fluid level is 600 feet from the surface, or at an
16 elevation of about 4500 feet, any of the rock appearing
17 above that in the cliffs above the river is going to be
18 air filled.

19 And so if it were possible to pump enough water
20 into the well to start crossing updip equal elevation
21 lines or structural contour lines, if it's possible to do
22 that, the outcrops are, first of all, going to experience
23 expulsion of air that's in the pore space. After that,
24 it's going to be unconfined fresh water that's in some of
25 the pore space. And so this is the reason why monitoring

1 seeps is important.

2 First of all, you won't see much of anything
3 because it will just be air, if you could even induce a
4 wall of water to go uphill towards the river. Second of
5 all, you are going to start expelling fresh water first,
6 which is going to be visible on the outcrops. And it
7 would be many, many years, and possibly centuries, before
8 injectate would ever reach the 5.8 miles.

9 And that's -- and so this cross section just
10 tries to put a little more of a -- an easier-to-evaluate
11 picture of how these two areas are related. And this
12 figure, also, I made a little more effort to add more
13 detail on the elevation of the river, the elevation of
14 more contour lines in feet. And so it's just got a
15 little more data on it. They all basically support the
16 same type of conclusions.

17 MR. CLAWSON: Moving to page 4 of the letter.
18 In the first full paragraph, it mentions, "Sandstones
19 with high transmissivity, which occur above the Westwater
20 Ranger Station."

21 Is the only sandstone that we're dealing with
22 here the Wingate Sandstone?

23 MR. ALLIN: For an injection zone, yes.

24 MR. CLAWSON: And we know where it -- it
25 outcrops in, actually, Ruby Canyon, upstream of Westwater

1 Ranger Station, right?

2 MR. ALLIN: Yes, that's right. And it's been
3 accurately mapped on multiple scales, which I've used in
4 figures.

5 MR. CLAWSON: And then have you looked for seeps
6 on those outcrops of the Wingate Sandstone and Ruby
7 Canyon?

8 MR. ALLIN: Yes, I have.

9 MR. CLAWSON: Did you find any?

10 MR. ALLIN: No.

11 MR. CLAWSON: You just testified that were water
12 to reach the Wingate Sandstone, you know, outcrop of the
13 Colorado, the first thing you'd see would be fresh water.

14 Do you see any purpose, any useful purpose, of a
15 monitor well to monitor the flow of the water?

16 MR. ALLIN: No.

17 MR. CLAWSON: And why is that?

18 MR. ALLIN: The outcrop examination is going to
19 give similar information. It just -- I think it's
20 redundant.

21 MR. CLAWSON: And do you see any purpose in a
22 monitor well for monitoring gas that may migrate -- be
23 generated at the Harley Dome well and then migrate?

24 MR. ALLIN: No, because the type of gas that is
25 a potential problem to be generated in a well like this,

1 it's created by assemblages of bacteria that normally
2 feed on hydrocarbons and produce hydrogen sulfide gas.
3 And if that is occurring, the way that it can be
4 monitored very easily is that at every cessation of
5 pumping at the injection well, or just when it's sitting
6 idle for whatever reason, H2S can be measured with highly
7 sensitive sensors. It's something that's a common
8 measurement that's made around well sites because people
9 are concerned because it's a poisonous gas. And so it's
10 very easy to recognize tiny concentrations. And the
11 cause of that gas, since it's known to be sulfate
12 producing bacteria, or SRBs, they can be killed with
13 treatments of, basically, bleach -- with biocides.

14 MR. CLAWSON: Okay. That's the end of my
15 questions for this witness.

16 As a bookkeeping matter, I'd like you to refer
17 to Exhibits 7 through 10, 12 and 13, and Rebuttal Exhibit
18 No. 3. I'm not going to ask for No. 2, just No. 3.

19 Were these prepared by you or by Westwater in
20 connection with this proceeding or in the regular course
21 of Westwater's business activities, or are they a part of
22 the public record in this proceeding?

23 MR. ALLIN: Yes.

24 MR. CLAWSON: I'd ask that Exhibits 7 through
25 10, 12, 13, and Rebuttal Exhibit No. 3 be admitted.

1 CHAIRMAN JOHNSON: Ms. Lewis, any objections?

2 MS. LEWIS: No objections from the Division.

3 CHAIRMAN JOHNSON: Mr. Shea?

4 MR. SHEA: No objection.

5 CHAIRMAN JOHNSON: Board?

6 Okay. So those exhibits are entered.

7 MR. CLAWSON: Thank you. That's the end of my

8 questions for this witness.

9 CHAIRMAN JOHNSON: Thank you, Mr. Clawson.

10 Let's take about a ten-minute break before we continue

11 with your questions, Ms. Lewis. So let's say about 3:30

12 let's reconvene.

13 (A break was taken from 3:17 p.m. to 3:32 p.m.)

14 CHAIRMAN JOHNSON: Okay. Let's resume. Okay.

15 Ms. Lewis, let's go ahead with you.

16 MS. LEWIS: The Division has no questions for

17 Mr. Allin.

18 CHAIRMAN JOHNSON: That was easy.

19 Mr. Shea.

20 MR. SHEA: First, I do want to thank the Board

21 for taking the time, which obviously has been much longer

22 than I expected, or certainly I'm assuming the Board did,

23 as well. I'll try to confine my questions to five areas.

24 CROSS-EXAMINATION

25 BY MR. SHEA:

1 MR. SHEA: The first, just as a technical
2 question, the geology and hydrology, if the transmittity
3 (sic) in the Wingate Formation is 22 percent, would that
4 mean that the flow of the water found there would be 15
5 or 20 feet per day, Mr. Allin?

6 MR. GILL: Just a point of clarification. Could
7 you reference a point in the statute or the regulations
8 or the application where that would be an issue?

9 MR. SHEA: Well, that goes to a question I was
10 also going to ask, and that is we keep going back to the
11 drinking water question. And I would include the
12 Colorado River under that jurisdictional question. If
13 that's not something that the Board is accepting, then I
14 simply want it noted in the record.

15 But my review is that a lot of time has been
16 spent, properly, in the process up to today's hearing
17 looking at the Moab public drinking water. But I'm also
18 looking at the Colorado River to meet the regulatory
19 requirements of the EPA as a source of public drinking
20 water. And if the Board disagrees with that -- I
21 understand why you might -- I just want it noted that
22 that's the disagreement between --

23 MR. GILL: And I'm not challenging you. It's
24 just compartmentalizing it.

25 MR. SHEA: I understand.

1 MR. GILL: You can say, "What I'm talking about
2 on the next line of questions is going to this provision
3 of the regulations or the statute or the application
4 where I want -- I'm going to show that you are either
5 violating that or you haven't complied with it." I think
6 that's kind of where I'm coming from. That would help
7 me.

8 MR. SHEA: Yeah, I understand. I think it's
9 difficult for me to make a prediction about a violation.

10 What I am trying to do is ask the questions that
11 then the Board could conclude there is a likelihood that
12 there would be a violation. And that may be a
13 distinction, from your perspective, without a difference.
14 But what I'm trying to do by asking the hydrology/geology
15 question is: Is there a chance -- and the Board has to
16 decide what level that chance would be acceptable at --
17 that the injected water would permeate the Colorado
18 River? And, you know, if your immediate answer is, "No,
19 there is no chance of that," then we obviously have a
20 disagreement.

21 But I am also trying to put down in the record
22 the understanding that their expert has on the geology
23 and hydrology.

24 And I think -- now, again, we haven't taken up
25 the bulk of the day. That's been by the proponents of

1 the permit. So I would ask the Board to just let us
2 explore these areas and see, because it does go to the
3 drinking water question. But as I said, if you view the
4 Colorado River as a nondrinking water source, then that's
5 a different question.

6 MR. JENSEN: It seems to me that -- didn't he
7 answer the question relative to getting into the
8 Colorado, and so your question would be, "Well, what are
9 the odds?"

10 MR. SHEA: Not necessarily what are the odds,
11 but what are the mechanics? There are two questions
12 here. One is the rate at which the water that's coming
13 in. The question earlier was that that particular strata
14 was already filled with water. And the comment, by
15 metaphor, was that, Well, it would just spill over.
16 Well, I think is Board is entitled to know where it's
17 going to spill over and at what rate it would spill over.

18 There's also testimony that above the area where
19 the UIC well has been drilled is filled with air in this
20 particular strata. And water has less volume -- or
21 excuse me, water has more volume than air. So I was
22 wondering why the statement was made that if there is
23 some leakage up, why there would first be fresh water as
24 opposed to air, which is far more difficult to ascertain.

25 And then the final area is that there is

1 anticline there. And I want to know why that anticline
2 might not be an anomaly where some of this water could
3 easily flow in unpredicted ways. So that's on the
4 geology/hydrology side.

5 MR. GILL: That helps me a lot.

6 CHAIRMAN JOHNSON: Go ahead, Mr. Shea. I think
7 your question had to do with transmissivity.

8 MR. SHEA: Yes. And the rate, given your
9 testimony, that it was 22 percent in Wingate. By my
10 calculations, that's 15 or 20 feet per day.

11 MR. ALLIN: There seems to be a
12 misunderstanding, because I didn't bring up, in my
13 testimony, transmissivity at all. I stated 22 percent
14 porosity from density logging.

15 MR. SHEA: So what would that translate into --
16 if you could make that calculation -- into
17 transmissivity?

18 MR. ALLIN: It would have been tested on core.

19 MR. SHEA: So we don't know what the flow rate
20 would be in the Wingate Formation?

21 MR. ALLIN: No. I have done some -- looked at
22 some published information on the Wingate that's not
23 local. Transmissivities there were low. But the rate of
24 advance of fluid through a sandstone that's 337 feet
25 thick, whether transmissivity is high or low, it's on the

1 order of centimeters per year.

2 MR. SHEA: This goes to the question a Board
3 member asked you; and that is, your testimony, I believe,
4 was that this particular segment was -- you found water
5 there with salt, correct?

6 MR. ALLIN: Yes, that's right.

7 MR. SHEA: So where does the water go when you
8 inject upwards to the limits that we've been talking
9 about, which I think were 60,000 barrels, or eight to
10 nine-acre feet, you know, at maximum production?

11 MR. ALLIN: And so I guess the question you are
12 asking is: What direction does the water move? Is that
13 right?

14 MR. SHEA: No. I know the direction from your
15 testimony. But it seems to be important, given some
16 anomalies there -- the anticline being an example -- to
17 get an answer from you. You've mentioned this idea of a
18 spillover, that water, if it came in by injection would
19 simply spill over. And I need to know where it spills
20 over to.

21 MR. ALLIN: It simply moves in a radial
22 direction through the formation to points of lower
23 pressure. The identifying points of lower pressure are
24 downdip from the well. So it's just across structural
25 contour lines. In this case, it's down the axis of the

1 Bryson Wash syncline.

2 MR. SHEA: And how do we know that there's a
3 lower pressure there without having drilled a well to
4 understand what the pressure was downstream or down the
5 incline?

6 MR. ALLIN: It was covered in -- I had mentioned
7 a study that's not part of these exhibits that I did on
8 the Entrada Sandstone, which is an analogous aquifer,
9 where you have an identified recharge point in the
10 Uncompahgre Uplift and the Colorado River, which, as a
11 whole, infuses fresh water into these porous formations.
12 It loads up and moves to areas of lower hydraulic head,
13 which are identified to be northward.

14 MR. SHEA: So you are asking the Board, by
15 analogy of another formation, to say this would be
16 similar?

17 MR. ALLIN: Yes. These formations are separated
18 by about 150 feet of rock.

19 MR. SHEA: Okay.

20 MR. CLAWSON: Pat, can I have you clarify a
21 point? You said they are going to inject 65,000 barrels.
22 Was that an annual rate or something?

23 MR. SHEA: I thought you --

24 MR. JENSEN: The testimony is 6500.

25 MR. SHEA: 6500, excuse me.

1 MR. CLAWSON: Then you used an acre foot. And I
2 wondered if you had made an annual --

3 MR. SHEA: Yeah, I miscalculated.

4 MR. CLAWSON: So it's 6500.

5 MR. SHEA: We did have a number of 16,000 at one
6 point. That's not your testimony.

7 So 6500 per day would be the highest rate you
8 could go at?

9 MS. LEWIS: Can I make a comment? Are you,
10 perhaps, referring to the maximum production of the
11 facility that they were hoping to do?

12 MR. SHEA: Yes. Thank you.

13 Does that clarify?

14 MR. CLAWSON: Thank you, yeah.

15 MR. SHEA: Let me also, Mr. Allin, when you
16 heard Mr. Clawson, I believe, characterize it as just
17 two percent helium in the area that is known as the
18 Harley Dome, is that considered a rich or poor helium
19 deposit?

20 MR. ALLIN: Two percent is probably relatively
21 rich.

22 MR. SHEA: Yes. So there would be some
23 significant value in the helium?

24 MR. ALLIN: Some value. But the reservoir
25 pressure -- because I had to study that in order to look

1 at the BLM's correlative rights -- the reservoir pressure
2 there in the Entrada is 185 pounds. So the entire -- the
3 entire resource of gas, including methane and -- it's
4 mainly nitrogen -- is really a small number.

5 MR. SHEA: But it's still commercially viable?

6 MR. ALLIN: There's no proof of that.

7 MR. SHEA: Okay. Let me move on to a question
8 of the determination on the graph, which I believe was
9 your exhibit where you showed the cross sections. And it
10 relates to 360 pound pressure psi.

11 Why is 360 a safe number as opposed to 320 as
12 opposed to 260?

13 MR. CLAWSON: I'm sorry, Pat, which exhibit are
14 you referring to?

15 MR. SHEA: Let me find it here. It's
16 Exhibit 12, page 2. The previous page. You just went
17 past it.

18 And you were pointing out that at seven barrels
19 per minute a fracture occurred. So the line of 400 psi
20 was dotted across there.

21 And my question, from a safety point of view, or
22 from, you know, migrating water to unknown areas, what's
23 the rationale of keeping it at 360 with some greater
24 margin than 40 pounds per square inch than at 360?

25 MR. ALLIN: Well, I'm not the -- as the permit

1 applicant here, it's not my purview to set that limit.
2 The regulatory agency here, the DOGM, normally will
3 select this, based upon a proven frac gradient, a frac
4 point here. This pressure of 400 psi, they will set a
5 limit by permit on giving this a little head room. Like
6 15 to 20 percent would be normally how you would set a
7 permit.

8 MR. SHEA: So is your testimony that it's the
9 staff of the Division of Oil, Gas and Mining that has
10 suggested 360?

11 MR. ALLIN: No. They haven't made a suggestion
12 yet. They will select a number, based upon knowing that
13 a fracture can be induced in this formation at
14 400 pounds.

15 MR. SHEA: And this, with Mr. Clawson's
16 permission, is perhaps where Dr. Stewart could answer the
17 question of how the 360 was determined.

18 MR. STEWART: I didn't determine it. It was
19 based off of what David Allin has provided. And in his
20 report, we came up with 3 1/2 barrels a day, which
21 calculates to the 6500 barrels -- 3 1/2 barrels a minute
22 calculates up to the 6500 barrels a day.

23 MR. SHEA: Just so the Board understands, I
24 think everyone agrees that a fracture is an undesirable
25 result of pumping the injection well. And I think it's

1 important to understand what the formula was in
2 determining the amount of barrels per minute as being
3 pumped into the injection wells.

4 MR. STEWART: Let me clarify my response. My
5 response is that the pressure will be set, and whatever
6 the pumping rate that accepts that is the pumping rate.
7 We're not saying that it's going to be 6500 barrels a
8 day. We're saying that's going to be at a certain
9 pressure. And whatever the formation accepts at that
10 pressure is what it will be.

11 MR. SHEA: Maybe Ms. Lewis can --

12 MS. LEWIS: If it pleases the Board, the
13 Division would like to clarify how they came upon their
14 number for psi.

15 MR. HILL: Typically, the Division will back off
16 ten percent of the breakover pressures indicated from
17 that step-rate test. And as far as our permits go,
18 typically we do not, although we could, establish maximum
19 volumes. We usually just, on our permits, use a maximum
20 injection pressure. And we just monitor the wells.

21 We do track volumes going into the wells. But
22 when we are monitoring them and inspecting them, we're
23 just monitoring the pressure.

24 MR. JENSEN: And if you look at Exhibit 13 on
25 page 3, the second paragraph, there's a pretty good

1 summary there of this -- David Dillon is talking about
2 and gets at kind of how they got to using the -- they
3 used 330 pounds by backing off roughly the ten percent
4 and got 6480 barrels. So that's how I kind of interpret
5 what you are talking about.

6 MR. HILL: Right. If the formation pressure's
7 up, we won't let them put one barrel a day down there.

8 MR. JENSEN: Correct.

9 MR. SHEA: And just for my edification, how
10 often will the pressure be taken by the Division? By
11 monthly reports, or --

12 MR. HILL: We do get monthly reports. And we
13 don't have a set time schedule for on-site inspections.
14 It's when we have somebody in the area, we have them
15 check them. If there hasn't been anybody in the area for
16 a while, we'll send somebody out specifically to check
17 them. But we monitor the reported pressures from them.
18 And we also do inspections.

19 MR. JENSEN: But if you set it at 330 pounds,
20 for example, that is it. And if you see anything above
21 330, the operator would be expected to shut down.

22 MR. HILL: Then they're out of compliance, and
23 they'd be subject to a Notice of Violation. And they'd
24 have to reduce the pressure.

25 MR. SHEA: And is there a reason in the day and

1 age of the internet that you couldn't get that on a daily
2 basis just so that you could monitor?

3 MR. HILL: I guess it's possible. We have not
4 gone there with our monitoring.

5 MR. SHEA: It does, again, seem to be
6 technologically, and rather inexpensively, able to do
7 that. But --

8 MR. HAROUNY: Mr. Shea, as you know, production
9 is reported on a monthly basis, as you know.

10 MR. SHEA: I understand that. And I simply
11 would point out that that's based on historic means of
12 communication. And in 2010, that means of communication
13 is expedited. And I'm just saying that it might be
14 worthwhile for the Board to consider this as one of those
15 conditions.

16 CHAIRMAN JOHNSON: Mr. Shea, your recommendation
17 for the permit or the approvals is noted. So let's move
18 ahead.

19 MR. SHEA: Okay. Let me raise the question of
20 the anticline.

21 Mr. Allin, explain to me, if you would, why that
22 Bitter Root -- Bitter Creek anticline wouldn't be a place
23 where some of this spillage that we've talked about might
24 not find its way.

25 MR. GILL: State your question again, please, if

1 you wouldn't mind.

2 MR. SHEA: On the map, which was marked as
3 Exhibit 7, it shows the Harley Dome site. And then there
4 is what's labeled a "Bitter Creek anticline." And I want
5 to have Mr. Allin explain to the Board why that anticline
6 wouldn't be a fracture that could cause leakage or a
7 conduit.

8 MR. ALLIN: And I guess in response, for one
9 thing, the figure Exhibit 7 is of such a large scale, it
10 doesn't really show, and the anticline isn't labeled on
11 it.

12 In the Rebuttal Exhibit 2, though, there's
13 enough detail that shows those structures and the
14 structural contours related to them.

15 MR. HAROUNY: Exhibits 9 shows them.

16 MR. SHEA: Taking Exhibit 2, it goes right
17 through the drill site straight to the Colorado River.

18 MR. ALLIN: Okay. So on 9, what we're looking
19 at is in order to characterize the structural
20 configuration of these formations, we have a contour
21 line's area of equal elevation on that formation. In
22 this case, the one nearest the injection zone is labeled
23 1500 meters, in this case. Basically, the actual
24 elevation of the top of the Wingate, of course, is around
25 3500 feet in elevation above sea level.

1 But the way the contours wrap around and the way
2 the injectate will move from a well -- and it's always
3 kind of a radial thing, anyway, out through the
4 perforations and into a porous formation -- the water is
5 mainly going to travel normal to those contour lines.
6 And, of course, the nearest normal point to the contour
7 lines in the well is actually drawn as an access for the
8 Bryson Wash syncline. And that's going to be the locus
9 of where the fluid is going to flow. And it's going to
10 be at a glacially slow rate.

11 For instance, a calculation that's made just on
12 the volume, even a conservative one of the volume of
13 fluid that's in the porous base in the injection zone,
14 will be about 10 million barrels. And so injecting at
15 rates of a couple thousand barrels a day, it takes many
16 years to even expel the brine water that's near the
17 wellbore any great distance.

18 MR. SHEA: Let me just point to the -- on the
19 map it shows a line that has a small arrow at the top
20 that's near the word "Bitter." And if you follow that
21 line down, it says "Bitter Creek," and then it says
22 "Anticline." It crosses the intersect of 1500 feet. And
23 then if you go down to where it says "Nearest Outcrop,
24 5.8 miles," it says "1750."

25 My original question was: Why will that

1 anticline, as a fault, not be a place that the water
2 might migrate to?

3 MR. ALLIN: Mainly because it's a fold and not a
4 fault.

5 MR. SHEA: Okay. And the fold does not have the
6 means of having water migrate to it?

7 MR. ALLIN: It can migrate to it, through it,
8 but it has to be pumped there. You have to be able to
9 put enough head onto it to back it up 800 feet across all
10 those contour lines. And that's what's impossible to do.
11 With the pressure limit that's going to be granted for
12 this project, which will probably be -- whether it's 350,
13 360, 330, it doesn't matter. If that's the pressure
14 limit, then it's going to be impossible, even with the
15 lowest density water I can find, which is fresh with a
16 pressure gradient of .33 psi per foot. Adding another
17 350 pounds to it, I can't push any water up 800 feet.
18 It's just physically impossible.

19 MR. SHEA: All right. Thank you.

20 Can I take one minute to --

21 CHAIRMAN JOHNSON: Go ahead.

22 MR. SHEA: All right. Do we have an opportunity
23 to summarize, or is that -- if I say we're concluded
24 now...

25 CHAIRMAN JOHNSON: I'm assuming that's only the

1 conclusion on the questioning you have for Mr. Allin?

2 MR. SHEA: Yes.

3 CHAIRMAN JOHNSON: Yes.

4 MR. SHEA: There will be?

5 CHAIRMAN JOHNSON: That's all the questions you
6 have for Mr. Allin?

7 MR. SHEA: I do.

8 CHAIRMAN JOHNSON: Okay. Thank you.

9 Does the Board have questions for Mr. Allin?

10 Okay.

11 Ms. Lewis, do you have redirect for Mr. Allin?

12 MR. CLAWSON: No, I don't.

13 CHAIRMAN JOHNSON: Okay. Thank you, Mr. Allin.

14 Do you have any other witnesses, Mr. Clawson?

15 MR. SHEA: I do not. I'm finished.

16 CHAIRMAN JOHNSON: Okay.

17 Ms. Lewis.

18 MS. LEWIS: We don't have any more questions for
19 Mr. Allin.

20 CHAIRMAN JOHNSON: Do you have any witnesses?

21 MS. LEWIS: Yes. We have two witnesses today.

22 We have with us Christopher Kierst, environmental
23 specialist, and Brad Hill, the permit manager.

24 In the issue of brevity, our presentation is
25 going to be rather short.

1 MR. GILL: Could you get really close to the
2 microphone or use your microphone?

3 CHAIRMAN JOHNSON: Combination of both of you.
4 Let's have them sworn, Ms. Lewis.

5 MS. LEWIS: Okay. Swear in our witnesses.
6 Could you please state your name.

7 CHAIRMAN JOHNSON: Mr. Kierst? Go ahead,
8 Michelle.

9 THE REPORTER: Will you raise your right hands,
10 please.

11 You do solemnly swear the testimony you are
12 about to give will be the truth, the whole truth, and
13 nothing but the truth so help you God?

14 (The witnesses answered in the affirmative.)

15 MS. LEWIS: Okay. First we'll have Mr. Kierst.

16 CHRISTOPHER KIERST,
17 having been first duly sworn,
18 was examined and testified as follows:

19 DIRECT EXAMINATION

20 BY MS. LEWIS:

21 MS. LEWIS: Mr. Kierst, would you please state
22 your name and position with the Division, as you did?

23 MR. KIERST: Christopher Kierst, Environmental
24 Scientist III with the Division of Oil, Gas and Mining.

25 MS. LEWIS: Could you briefly identify for the

1 Board your professional credentials?

2 MR. KIERST: I have a degree in geology from the
3 University of Missouri, Columbia. And in addition, I've
4 got experience in the energy industry overall since 1972,
5 and -- primarily in oil and gas. And a little bit of
6 uranium geology, five-year stint with the Tennessee
7 Valley Authority.

8 MS. LEWIS: How many years have you been with
9 the Division?

10 MR. KIERST: I've been with the Division for 21
11 years.

12 MS. LEWIS: And what are your professional
13 responsibilities for the Division in general, and what
14 specific to the Westwater Farms application?

15 MR. KIERST: I've got sundry duties with the
16 Division of Oil, Gas and Mining. But as regards this
17 matter, I'm the primary Class II program permit agent for
18 the Division.

19 MS. LEWIS: And earlier we submitted two
20 exhibits we'd like the Board to take notice of. The
21 first is the Permit Statement of Basis, and the second is
22 the UIC Injection Analysis Form.

23 So Mr. Kierst, are you familiar with these two
24 documents, and have you examined them?

25 MR. KIERST: Yes, I'm familiar with them.

1 MS. LEWIS: Could you please briefly describe
2 for the Division the purpose of these documents?

3 MR. KIERST: The permit analysis form, I guess
4 that's Exhibit 2, is essentially an inventory of items
5 that the Division requires an operator to submit to
6 obtain a permit for a Class II injection well.

7 MS. LEWIS: Okay. And under this document, has
8 the applicant fully satisfied all the requirements of
9 Rule 649-5-2?

10 MR. KIERST: That's what we find at this time.

11 MS. LEWIS: Would you also please explain for
12 the Division Item No. 2.7 that is currently in red and
13 the status of that?

14 MR. KIERST: Yes. At the time this form was
15 printed, we had not yet received the compatibility
16 analysis. We have received that compatibility analysis
17 from Stewart Environmental. And we received it on
18 December the 6th.

19 MS. LEWIS: Do you feel the compatibility
20 analysis is satisfactory?

21 MR. KIERST: Yes, it is.

22 MS. LEWIS: Do you feel any concerns raised
23 about the application haven't been sufficiently
24 addressed?

25 MR. KIERST: I don't feel there are any concerns

1 that I was aware of at the time that I prepared these
2 documents. So as of that time, there were no issues.

3 MS. LEWIS: In conclusion, what would be your
4 recommendation for the Board regarding the Westwater
5 Farms application?

6 MR. KIERST: I don't see any reason why they
7 should be denied a permit.

8 MS. LEWIS: All right.

9 CHAIRMAN JOHNSON: Ms. Lewis, just to establish,
10 you were calling it, I guess, Division Exhibit 2?

11 MS. LEWIS: Umm-hmm.

12 CHAIRMAN JOHNSON: And that was the Injection
13 Permit Analysis Form?

14 MS. LEWIS: Yes.

15 CHAIRMAN JOHNSON: And that's four pages. Is
16 that correct?

17 MS. LEWIS: It's one page. It's a checklist.
18 And essentially what it does is it lists --

19 CHAIRMAN JOHNSON: Oh, I have four copies of it.
20 That's why they don't have any.

21 MR. JENSEN: Then the rest of us will be with
22 you.

23 MS. LEWIS: It just essentially enumerates the
24 requirements of 649-5-2.

25 CHAIRMAN JOHNSON: Thank you.

1 MS. LEWIS: Does the Board have any -- sorry.

2 CHAIRMAN JOHNSON: Okay. And the Permit

3 Statement of Basis, did you call that Division Exhibit 1?

4 MS. LEWIS: Yes.

5 CHAIRMAN JOHNSON: And is Mr. Hill going to

6 testify to that?

7 MS. LEWIS: Mr. Kierst, as well. They're kind

8 of taken in tandem to support each other.

9 CHAIRMAN JOHNSON: Okay. I'm sorry, go ahead,

10 then.

11 MS. LEWIS: Mr. Kierst, do you want to explain

12 just kind of, maybe in a narrative nature, Exhibit 1

13 versus the checklist?

14 MR. KIERST: Yeah. The information in Exhibit 1

15 basically is a digest and statement of what the operator

16 has submitted to satisfy the requirements to get a

17 permit. And so we put it in narrative form. And it's

18 basically our statement to support our decision for

19 issuing a permit.

20 MS. LEWIS: Those are all my questions for

21 Mr. Kierst.

22 CHAIRMAN JOHNSON: Okay.

23 CROSS-EXAMINATION

24 BY MR. JENSEN:

25 MR. JENSEN: So as I look at this, Mr. Kierst,

1 on page 2 of the Division Exhibit 1, the injection
2 pressure is going to be 260 pounds at the surface?

3 MR. KIERST: That was requested on the UIC Form
4 1 Application. That is Item No. 2 on the Permit Analysis
5 Form, the Exhibit No. 2.

6 MR. JENSEN: So I'm just trying to understand.
7 So if the permit issues, their limit is 260 pounds at
8 surface?

9 MR. KIERST: We may modify that, I believe.
10 That's all they asked for.

11 CHAIRMAN JOHNSON: That's at the surface.

12 MR. JENSEN: Okay. I'm trying to understand if
13 this Board grants it, are we granting it at 260 pounds?

14 MR. KIERST: We could grant the 260. At this
15 time, we don't have a set figure, I guess, that would
16 necessarily reflect that.

17 MR. JENSEN: I think that we've heard that
18 400 pounds is --

19 MR. CLAWSON: That's 260 psi at the surface.

20 MR. ALLIN: That was the pretesting.

21 MR. CLAWSON: Can you explain?

22 MR. ALLIN: Yes. I think where the confusion
23 is, is that the UIC permit form, which I filed, was filed
24 in 2009 and almost a year before the well was drilled,
25 the exploratory well, the HD-1. And so it's just

1 something -- it's a number that's fill-in-the-blank
2 because the way to determine what the maximum allowable
3 injection pressure is going to be is once you establish a
4 frac rating. So you have to establish a frac rating. I
5 didn't have that data when I filled out the form and just
6 filled it in with 260.

7 MR. JENSEN: So the 260 is in the application,
8 which was filed at the beginning. Now you've drilled the
9 well. Now you've got your information. What's the
10 number?

11 MR. ALLIN: Well, the number will probably be
12 something more like 360.

13 MR. JENSEN: Okay. And what is -- I'm just
14 trying to get a handle on if we approve this, at what
15 level are we approving it?

16 MR. KIERST: Given what we normally do as far as
17 backing off the breakdown pressure, it would be probably
18 around 360.

19 MR. JENSEN: Okay. Thank you.

20 CHAIRMAN JOHNSON: Ms. Lewis, would you like to
21 enter Exhibits 1 and 2?

22 MS. LEWIS: Yes. I'd like to enter Exhibits 1
23 and 2.

24 CHAIRMAN JOHNSON: We'll call those Division
25 Exhibits 1 and 2.

1 Mr. Clawson, any objections?

2 MR. CLAWSON: That's fine.

3 CHAIRMAN JOHNSON: Mr. Shea?

4 MR. SHEA: No objection.

5 CHAIRMAN JOHNSON: Does the Board have any?

6 Mr. Payne?

7 MR. PAYNE: I have a question to -- we can take

8 care of this, and then if I could ask my question.

9 CHAIRMAN JOHNSON: So Division Exhibits 1 and 2

10 are in.

11 Mr. Payne, what was your question?

12 MR. GILL: Just a clarification. What was that

13 last -- was it 360 or 350?

14 MR. KIERST: 360.

15 MR. PAYNE: 3-6-0.

16 CHAIRMAN JOHNSON: Go ahead.

17 CROSS-EXAMINATION

18 BY MR. PAYNE:

19 MR. PAYNE: Question, Mr. Kierst: We've heard

20 discussion about no receipt of frac water, fracking

21 water, or if there were, that it would need some

22 pretreatment. Is that something that's typically

23 regulated by the Division? Where would such an operating

24 restriction be placed -- or Mr. Hill, one of the two of

25 you?

1 MR. HILL: A Class II injection well is allowed
2 to take any type of fluids in that are RCRA exempt for
3 that Class II injection. And completion and stimulation
4 fluids do follow under what is typically allowed in Class
5 II wells. So we usually don't try and separate out
6 different types of fluids. We're specifically looking if
7 that RCRA exception applies.

8 MR. PAYNE: So the BLM concern about gas
9 generation and the proponent's offer of not accepting
10 those fluids, that's just an agreement, side agreement,
11 between them and BLM? The Division is not part of that?

12 MS. LEWIS: That's voluntary with them, that's
13 not a restriction generally placed on a Class II well by
14 the Division.

15 CHAIRMAN JOHNSON: Thank you.

16 Ms. Lewis, have you finished your examination of
17 Mr. Kierst?

18 MS. LEWIS: I just have a brief question for
19 Mr. Hill.

20 CHAIRMAN JOHNSON: Let's see if anyone else has
21 questions for Mr. Kierst, and then we'll move on.

22 MR. CLAWSON: No questions.

23 CHAIRMAN JOHNSON: Mr. Shea?

24 MR. SHEA: I have, and it's a follow-up on Mr.
25 Payne's question.

CROSS-EXAMINATION

BY MR. SHEA:

MR. SHEA: It could be a condition to the granting of this application, could it not, that we accept or that we -- sorry. I always like to think of the royal "we."

The Board could accept the offer by the proponent for the application, that they would accept no fracked water as a condition for the granting of the application.

MR. JENSEN: Well, they've said they'll accept it. It's that they won't inject it.

MR. SHEA: Inject it. Thank you. That's what I meant.

MS. LEWIS: It seems that -- I mean, under the requirements, the Division is only required to -- Class II injection wells for those type of wells that frac water is exempt under RCRA, so they wouldn't need to have any kind of conditions on the permit. It seems it would be more an appropriate accommodation between the BLM and operator.

MR. HAROUNY: I'm in full agreement of that.

MR. JENSEN: That wasn't Mr. Shea's --
Mr. Shea's question was: Would it be problematic if your permit contained that stipulation?

1 CHAIRMAN JOHNSON: Based upon the regulations,
2 that's not a requirement that the Division would place on
3 the permit. Is that correct?

4 MS. LEWIS: Yeah.

5 MR. JENSEN: That's correct.

6 CHAIRMAN JOHNSON: So that will be up to the
7 permittee if they wanted to place that restriction upon
8 themselves.

9 MR. PAYNE: The question was not whether they
10 normally do, but could they. That's your question.

11 MR. SHEA: That's correct.

12 MR. PAYNE: Could the Division impose that
13 condition, was the question.

14 MR. SHEA: And if I could, just to suggest that
15 when you are working on an MOU from the EPA to have the
16 federal regulations handled by the Board, which I think
17 is a good idea, then there is some latitude with what
18 would be a sister agency; namely BLM, who is not present
19 here today.

20 MR. CLAWSON: I think that's a legal conclusion
21 whether they could.

22 MR. SHEA: Well, that's what I was asking.

23 CHAIRMAN JOHNSON: Okay. So Mr. Shea, I'm
24 taking that as another suggestion that you have for them.

25 MR. SHEA: It wasn't a suggestion. It was just

1 a question of whether you had the power to do that. And
2 so far, I've heard what the practice is, but not whether
3 you could put that as a condition.

4 MR. HILL: That would also put the Division in
5 having to monitor that for compliance. And we're a
6 little uncomfortable arbitrarily picking and choosing
7 between legal fluids and making them conditions of
8 approval. It may be more of a legal question. I'm not
9 sure whether the Board should or could do that. I can't
10 answer that.

11 MR. SHEA: I guess my only question is: If not
12 the Board and the Division, then who would do it?

13 CHAIRMAN JOHNSON: The rules, the way they're
14 written, do not exclude frac fluids.

15 MR. SHEA: I understand that.

16 CHAIRMAN JOHNSON: I think that's --

17 MR. SHEA: I'm asking the reverse of the
18 question: Because they don't exclude it, does that mean
19 you can't include it?

20 MS. LEWIS: It's not really in the purview of
21 what we're supposed to be doing.

22 MR. SHEA: Why is it that administrative
23 agencies can, without specific statutory or regulatory
24 restrictions, say, "This is a condition by which we would
25 exercise these activities"? And I'd point to

1 R641-100-400, "Deviation From the Rules. When good cause
2 appears, the Board may permit a deviation from these
3 rules insofar as they may find the compliance therewith
4 to be impractical, unnecessary, or in the furtherance of
5 justice or the statutory purpose of the Board."

6 CHAIRMAN JOHNSON: Mr. Shea, I'll take that as a
7 suggestion that you have for the issuance of a permit.
8 And the Board will take that into consideration. So
9 let's move forward. I don't think the Board's prepared
10 to give you an answer on that now.

11 MR. SHEA: And I do greatly appreciate the
12 Board's indulgences today. I do think at some point that
13 question should be answered so the parties in the
14 future -- in two weeks, you are going to be faced -- or
15 in your January meeting, you're going to be faced with
16 another injection well application approximately
17 two miles away. So I think this is going to be a
18 repeating kind of question. And the jurisdictional
19 authority of the Board would benefit from being clarified
20 on that. So I take it as a suggestion.

21 CHAIRMAN JOHNSON: Okay. Thank you, Mr. Shea.

22 MR. SHEA: Okay. Could I follow up, though?

23 CHAIRMAN JOHNSON: Yes. You still have
24 questions for Mr. Kierst?

25 MR. SHEA: I do.

1 CHAIRMAN JOHNSON: Go ahead.

2 MR. SHEA: Are there other conditions,
3 consistent with the regulations, that you think the Board
4 should consider in light of the application?

5 MR. KIERST: I don't think I see any of these
6 coming up.

7 MR. SHEA: Thank you.

8 CHAIRMAN JOHNSON: Does the Board have any
9 questions for Mr. Kierst?

10 Do you have any redirect, Ms. Lewis?

11 MS. LEWIS: No. I agree with the Board's
12 comments.

13 CHAIRMAN JOHNSON: Okay. Let's move on to
14 Mr. Hill.

15 BRAD HILL,
16 having been first duly sworn,
17 was examined and testified as follows:

18 DIRECT EXAMINATION

19 BY MS. LEWIS:

20 MS. LEWIS: And we would just like to have
21 Mr. Hill address paragraph C of Living River's motion
22 they filed this morning regarding the amount of the bond,
23 as well as the well plugging plan.

24 MR. HILL: The bond that we have on this well as
25 an injection well is the same plugging bond that we have

1 on all of our oil and gas wells everywhere in the state
2 based on -- by rule, R649-3-1 establishes a normal
3 plugging bond for wells between 1000 feet and 3000 feet
4 at \$15,000.

5 As far as plugging plans go, this well is also
6 under the same rules as any other oil and gas well for
7 plugging procedures, which is under R649-3-24. And if
8 this well -- the operator should walk away and we're
9 stuck with plugging the well, we have that bond. The
10 Division would plug the well.

11 If the well were shut-in for an extended period,
12 it would be under the shut-in and temporarily abandoned
13 wells rules, which are R649-3-36, on top of the required
14 five-year mechanical integrity testing under the
15 underground injection permit.

16 So this well couldn't just be left open for an
17 extended period and not be plugged if the well was not
18 injecting under a valid permit.

19 MS. LEWIS: That's all my questions for
20 Mr. Hill.

21 CHAIRMAN JOHNSON: Mr. Clawson, do you have any
22 questions?

23 MR. CLAWSON: I have no questions.

24 CHAIRMAN JOHNSON: Mr. Shea?

25 MR. SHEA: I do.

CROSS-EXAMINATION

BY MR. SHEA:

MR. SHEA: I've had some unfortunate experiences with bonds for BLM. The calculation, as laid out in the application, is based on dismantlement. Is that correct?

MR. HILL: I could not hear you.

MR. SHEA: I'm sorry. The calculation, as laid out in the application, is based on dismantling the facility and plugging it?

MR. HILL: Our bond would be considering the plugging of the well only. On occasion, if there's money left over, we would also do other reclamation-type things with that bond. But generally, it is for plugging the well only.

MR. SHEA: There's a term from World War II of "snafu." Are you familiar with that?

MR. HILL: I am familiar with that.

MR. SHEA: If a snafu was to occur at this site, there would be nothing beyond the \$15,000 to compensate the State or any party that was injured by that. Is that correct?

MR. HILL: That's correct. When you say "injured by that," I'm not sure what you mean.

MR. SHEA: Say that something happened with the pumping or a spillage and one or two of the trucks, you

1 know, dumped their load, and somehow somebody was down
2 stream.

3 MR. HILL: So we needed some site remediation,
4 or something of that nature.

5 MR. SHEA: Yes. Right.

6 MR. HILL: Depending on the extent of
7 remediation needed, it may not be enough to cover it. We
8 do also have the orphan well program funds from which we
9 can draw to make sure the environment is protected and
10 pollution does not occur from any given well.

11 MR. SHEA: But in terms of what this application
12 is bringing to the Division, it's the \$15,000. And then
13 there are other sources that could be used for
14 remediation. Is that your testimony?

15 MR. HILL: There is, depending on what needed
16 remediating, yes.

17 MR. SHEA: All right. Thank you.

18 CHAIRMAN JOHNSON: Does the Board have questions
19 for Mr. Hill? Okay.

20 Ms. Lewis, do you have any redirect of Mr. Hill?

21 MS. LEWIS: No.

22 CHAIRMAN JOHNSON: Okay.

23 MS. LEWIS: The Division has no more questions.

24 CHAIRMAN JOHNSON: No more witnesses?

25 MS. LEWIS: No more witnesses.

1 CHAIRMAN JOHNSON: Okay. Thank you.

2 Mr. Shea, do you have witnesses?

3 MR. SHEA: We have no witnesses.

4 If we had had time, we would have liked to have
5 brought a hydrologist, but we did not. So we have no
6 witnesses today.

7 CHAIRMAN JOHNSON: So you have nothing else.
8 I'm trying to think where we're at now.

9 Mr. Clawson, I guess you can summarize.

10 MR. CLAWSON: Thank you, Mr. Chairman. I'll
11 keep this really short. This has been a long hearing.
12 And I think the Board's, you know, very well versed in
13 the issues involved.

14 The proposed Harley Dome No. 1 injection well is
15 a simple UIC application. It would have been
16 administratively approved by the Division. The Board
17 wouldn't have even known about it except that Living
18 Rivers and others filed objections when the notice of the
19 informal process was published in the paper. That meant
20 that we needed to come before the Board. And that's why
21 we really are here. I think it's been educational for
22 the Board, and it's probably been of benefit in that
23 regard.

24 But I would say that Westwater Farms has met its
25 evidentiary burden. It has satisfied the regulatory

1 criteria necessary for the Board approving the UIC
2 permit.

3 And we've addressed the respondent's concerns.
4 We have sworn testimony by expert witnesses that this
5 water will not flow uphill to the Colorado River. And we
6 also have sworn testimony that gas will not be allowed to
7 be generated in the formation that the water's being
8 injected into; and so therefore, gas also will not
9 migrate to the Colorado river.

10 I would urge that the Board approve this
11 application. And I thank you for your time.

12 CHAIRMAN JOHNSON: Ms. Lewis.

13 MS. LEWIS: We feel -- the Division feels that
14 the applicant has fulfilled all the requirements of the
15 rules. And they, under their expertise, recommend
16 approving the well.

17 CHAIRMAN JOHNSON: Thank you.

18 Mr. Shea.

19 MR. SHEA: First, I'd like to thank the Board
20 for their time. I appreciate this has been made more
21 complicated, if you will, by my presence. And I've
22 certainly appreciated the courtesies by you and the staff
23 and Mr. Clawson.

24 I would renew my request that the record be kept
25 open for two weeks so that if we are able to generate

1 some additional evidence, we could submit it to the
2 staff. They could determine whether it should be passed
3 on to the Board or not.

4 CHAIRMAN JOHNSON: Mr. Shea, could you give us
5 some kind of indication of what type of evidence you are
6 working on?

7 MR. SHEA: Two-fold. During the lunch break, I
8 spoke with a geohydrologist at the University of Utah,
9 who is a colleague. And he has worked on injection wells
10 specifically and the filtration, as well as the chemical
11 processing that Dr. Stewart talked about. I want to
12 explore with him as to whether or not he considers it
13 adequate.

14 If we are not able to generate anything, we
15 certainly wouldn't. But I would hate to find out
16 something that I think would be pertinent for the Board's
17 review, and then because it was decided on the same day
18 it was heard, not have an opportunity to present it.

19 I also want to examine, again, through a
20 geologist, any fractures or fault lines that might
21 differentiate this area. I certainly appreciate
22 Mr. Allin's testimony, but I think a second look at
23 things would be of benefit. So that's the first request.

24 The second request would be to have monitoring
25 wells to the southeast. And again, I understand the

1 Board's inclination to accept the geology as being
2 completely moving water uphill, which I appreciate from
3 physics is impossible if not difficult. So but I still
4 would make that request, that they -- I do think the
5 Board is setting a precedent that other people in the oil
6 and gas business are going to -- and Dr. Stewart, I think
7 has done a very wise business investment on getting this
8 going. And there will be others that will follow. And
9 we ought to, you know, as a community, be able to look at
10 whether or not monitoring in real time is an important
11 aspect that is now technologically feasible without a
12 great deal of additional cost.

13 CHAIRMAN JOHNSON: Thank you. I didn't mean to
14 interrupt your summary. So please go ahead.

15 MR. SHEA: No. Again, it's one of those things,
16 where I think anybody who witnessed the BP spill
17 appreciates how, as we get more technologically advanced,
18 the snafus that we all recognize happen can have a much
19 greater ramification that we can ever believe or
20 appreciate. And we need to take some moments to pause.

21 And I can appreciate from Dr. Stewart's
22 perspective the idea that they've been at this for a
23 year-and-a-half. But given the location and given what's
24 being injected, there needs to be very clear deliberation
25 on that. That's it.

1 CHAIRMAN JOHNSON: Thank you, Mr. Shea.

2 Is there anyone else present who would like to
3 address the Board regarding this matter? Seeing no one.

4 MR. JENSEN: Given that they've got a hearing on
5 tonight, why don't we take ten minutes and then caucus
6 and see whether we're inclined to reach a decision or
7 take it under advisement.

8 CHAIRMAN JOHNSON: Okay. Let's take a
9 ten-minute break.

10 And Mr. Clawson, I believe you have the next
11 matter, also.

12 MR. CLAWSON: It should be very short.

13 CHAIRMAN JOHNSON: It's just a report.

14 MR. CLAWSON: But I have to tell you about
15 something, too. But it will be very short, about five,
16 ten minutes.

17 CHAIRMAN JOHNSON: Then we will be hearing the
18 Wolverine matter after that. So let's take a ten-minute
19 break.

20 (A break was taken from 4:24 p.m. to 4:35 p.m.)

21 CHAIRMAN JOHNSON: Let's go back on the record.

22 Regarding the Westwater Farms request, the Board
23 feels unanimously that the petitioner has met its
24 requirements for approval of the UIC well. The injection
25 pressure should be set at 360 psi, subject to monitoring.

1 And in accordance with Board rules, if any
2 parties would like the decision by the Board
3 reconsidered, they have 20 days in which to do so.

4 So Mr. Clawson, would you please prepare the
5 Order?

6 MR. CLAWSON: I'd be glad to, Mr. Chairman.

7 The rules provide that I should have the Order
8 prepared within five business days after this hearing.
9 And I think it's pretty obvious I've got kind of a lot to
10 do. So I'd appreciate if there would be a little bit
11 more time for that.

12 CHAIRMAN JOHNSON: Mr. Shea would probably be
13 agreeable to you taking 20 days.

14 MR. SHEA: I'd be happy with that.

15 MR. JOHNSON: The 20 days runs from the written,
16 signed Order.

17 CHAIRMAN JOHNSON: That's 20 days from the
18 signed Order, Mr. Shea.

19 MR. SHEA: Yes, I understand that. And if Mr.
20 Clawson would like my help, I'm more than happy to...

21 MR. CLAWSON: Sure.

22 CHAIRMAN JOHNSON: Thank you very much.

23 MR. SHEA: In that time period, is the
24 administrative record open?

25 CHAIRMAN JOHNSON: No. The record is closed.

1 The record is closed.

2 If you would like our decision on the Order
3 reconsidered, you'll have 20 days from the date it's
4 signed to have that reconsidered.

5 MR. SHEA: I understand.

6 CHAIRMAN JOHNSON: Thank you.

7 (The matter was concluded at 4:38 p.m.)
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Michelle Mallonee, RPR, CSR